

## **Chapter 23.44. REGIONAL PROBLEM SOLVING FOR SOUTH DESCHUTES COUNTY**

### **23.44.010. Regional Problem Solving for South Deschutes County.**

#### **23.44.020. Goals.**

#### **23.44.030. Strategies.**

#### **23.44.040. Map.**

### **23.44.010. Regional Problem Solving for South Deschutes County.**

#### **A. Overview.**

In the 1960's and early 1970's, before statewide planning occurred in Oregon, over 15,000 lots were created in subdivisions platted south of Sunriver. Most of these parcels are less than two acres in size and use on-site septic systems to dispose of sewage. Many of them are located in areas where development is now restricted, such as floodplains, wetlands and areas with a high groundwater table where septic approval is unlikely.

Since 1989, Deschutes County has been the fastest growing county in the state on a percentage basis. The rural character, attractive location on or near the Deschutes and Little Deschutes Rivers, and relatively inexpensive land prices in South Deschutes County have led to a burgeoning population. The current estimated population of up to 16,000 residents (over 10,000 permanent) would make this area the second largest city in Oregon east of the Cascades were it incorporated, exceeded only by the city of Bend. Impacts to groundwater, the source of drinking water in this area, air quality, wetlands and mule deer migration and the risks to human life and property from wildfires have increased significantly over time.

In 1996, Deschutes County and the Department of Land Conservation and Development recognized that significant consequences could occur from the pattern of development and began a collaborative project known as Regional Problem Solving Project for South Deschutes County. The Regional Problem Solving (RPS) project area encompasses approximately 42 square miles between Sunriver to the north and La Pine to the south, and includes thousands of small-subdivided lots, and some larger parcels, throughout southern Deschutes County. The attached map identifies Study Areas 1, 2 and 3 within the project area.

The RPS project area is a landscape with a geologic history that produced sediments of volcanic origin that were deposited in a basin over past eons. These conditions are the result of lava flows from the west (Cascades) and east (Newberry) that periodically dammed and shifted the course of the Deschutes River, creating the La Pine Basin, where the deposition of sediments has occurred, sometimes burying older forests. Volcanic eruptions such as the one at Mt. Mazama (Crater Lake) approximately 6,800 years ago have contributed significantly to the volume of sediment deposited in the basin. The Mt. Mazama eruption is the source of volcanic material that has formed the predominant soil in the area.

At an elevation of 4200 feet, the climate in the region is one of cool nighttime temperatures with a short frost-free summer that averages less than 100 days annually and a winter period of five or six months where snow can reside on the ground at any time. The rivers receive significant input from cool spring fed waters. The groundwater is mostly derived from snowmelt in the high Cascades to the west, and is also relatively cool.

The development of thousands of small lots in the RPS project area is therefore superimposed upon highly permeable, rapidly draining soils and a high groundwater table with relatively cold-water temperatures. The overwhelming majority of the lots are served by on-site sewage disposal systems (septic systems), including standard drain fields, cap and fill systems, and more recently sand-filter systems. Nitrates, a by-product of septic systems and an indicator of human pathogens, are poorly retained in the fast draining soils and do not easily break down due to the cool groundwater temperature.

As a result, loading of nitrates occurs in the shallow groundwater aquifer that underlies this region. The presence of a high level of nitrates is of great concern because this same aquifer is the source of drinking water for the residents in the area.

A recent US Geological Survey study of groundwater in Central Oregon concludes that groundwater in the area is connected to nearby surface waters, including the Deschutes and Little Deschutes Rivers. Through the sampling of numerous wells in the RPS project area the Oregon Department of Environmental Quality (DEQ) is predicting that nitrate in the groundwater will approach unsafe levels, principally as a result of the cumulative effect of sewage disposal with on-site septic systems, in the near future. Levels of nitrate are elevated in several localized areas within the RPS project area. However the majority of wells show very low nitrate levels at this time and surface water contamination has not been documented.

Due to the existing pattern and density of development DEQ is predicting that nitrate levels will continue to increase over time, even if measures were taken now to alter the development pattern in the RPS project area. If measures are delayed much longer, the consequences could become more serious, possibly resulting in unsafe levels of nitrates in groundwater and drinking water.

More definitive information is expected to be available in the next few years, regarding the timing of nitrate movement in groundwater and the overall impact of nitrate from septic systems to groundwater and possible surface water pollution. The DEQ and Deschutes County will complete additional groundwater investigations and testing of innovative sewage treatment and disposal systems to reduce the impact on groundwater from nitrogen in household sewage, with grants from the US Environmental Protection Agency. The results from these studies will not be known for several years. Studying different approaches to on-site sewage treatment and disposal may lead to affordable technological advances that can be applied to new and possibly existing systems. In the meantime, the region will continue to grow and nitrate loading from on-site systems will continue to increase.

Some measures may need to be implemented in the future to address groundwater pollution and other impacts that could result from the development of the thousands of small size subdivided lots in South Deschutes County. The creation of a new neighborhood between La Pine and Wickiup Junction as an alternative to building fewer houses on the remaining vacant small lots appears to hold much promise. A market-driven transferable development credits program could assist in the redirection of growth from the existing subdivisions into this new neighborhood.

A development standard or sewage disposal rule that requires an effective lot area of 1.5 acres for new dwellings served by an on-site septic system may need to be considered. The acreage requirement would need to be based on the long-term balance between nitrate loading from septic systems and dilution from precipitation that infiltrates the land. An effective lot area should include contiguous or non-contiguous vacant land within a specified distance from the proposed building site.

For these reasons, Deschutes County has determined that it is appropriate to adopt comprehensive plan goals and policies to recognize the importance in protecting groundwater and other resources and the need to continue to work on the Regional Problem Solving project for South Deschutes County.

B. Nitrates - Health and groundwater impacts; septic system impacts and studies.

High levels of nitrates in drinking water are a cause of methemoglobinemia (blue baby syndrome) in infants and have been linked to cancer and weakening of immune system in the elderly. Recent epidemiologic studies indicate that chronic long-term exposure to low levels (2.5 mg/L) of nitrates can increase the risks for certain types of cancers. Nitrate levels are often used as an indicator for the transmission capabilities of other pathogenic agents. Surface waters are very sensitive to eutrophication by the addition of nutrients; nitrate is an indicator of nutrient loading.

A natural background level of nitrates would be less than 1 mg/L. The Environmental Protection Agency (EPA) has set the safe water drinking standard (Maximum Contaminant Level or MCL) for nitrate at 10 mg/L. The DEQ is required to declare a region a Groundwater Management Area if nitrate concentration reaches 7 mg/L. This would require a plan to protect and restore groundwater quality. Deschutes County Planning and Environmental Health are only slightly ahead by starting and developing their plans proactively.

On-site septic systems are the only significant source of nitrates in the La Pine sub-basin. The La Pine sub-basin has many conditions that allow for little denitrification of wastewater to occur: rapidly draining soil, shallow, well oxygenated groundwater, very short growing season, cold temperature, not much hydraulic gradient. Most of the development has taken place in the very bottom of the sub-basin over shallow groundwater and on small lots served by wells from an unconfined aquifer.

In 1980-81 contamination of the aquifer from septic systems had already occurred in the La Pine core area as of 1980-81 (La Pine Aquifer Management Plan, Century West, 1982). A community sewer system was required to remedy the situation. A 1995 well monitoring study by DEQ showed that after 11 years of sewer, the nitrate levels in the La Pine core area had receded but were still at “unsafe levels.” This is an indication that the recovery time for the aquifer is lengthy.

The 1995 monitoring study also revealed the existence of five areas in the RPS project area, not including the core area of La Pine, where nitrate levels are greater than usual background levels. Nitrate levels are as high as 4.8 to 5.9 mg/L in three of these areas and as high as 3 mg/L in the other two.

The 1995 monitoring study was part of a modeling effort by the DEQ to estimate the impact of septic systems on the groundwater. The initial results of the model indicate that at existing (1994) development the aquifer would reach nitrate levels of 7 mg/l by 2005. Since the collection of samples in 1994 there are approximately 700 additional residences in the RPS project area using on-site septic systems. The model is limited because it is two-dimensional and does not account for flow in or out of its boundaries.

A grant from the US Environmental Protection Agency will allow significant work to begin in 1999 to help with a solution to the problem of high nitrate levels. The primary purpose of the grant is to study new technologies in on-site septic systems. Part of the grant will be used to continue increasing the groundwater monitoring network and complete additional analysis of nitrate movement in the groundwater using a three dimensional model.

The innovative septic system program was started in 1998 through the RPS project and DEQ grant funding and is expected to increase significantly with the new federal grant. The purpose is try new technologies that appear to be capable of reducing nitrate levels. Besides nitrate reduction there are many other aspects of new technology that need to be examined before widespread applications for the general public can occur.

Over the past five years the US Geological Survey (USGS) has developed a groundwater flow model of the entire Upper Deschutes Basin. The model will be used as the basis for an analysis of the impacts of nitrates from on-site systems to help answer the following three questions:

1. Where should additional monitoring wells be set up for continuous monitoring of nitrate plumes from residential development?
2. What density does development need to be set at to minimize impact on groundwater quality?
3. What variations of impact due to location are there in the La Pine sub-basin?

The DEQ rules require a minimum of an acre for standard system and a half-acre for pressure or sand filters in rapidly draining soils. This is a statewide rule and the authors were probably looking at rainfall amount from a typical Willamette Valley year to provide dilution.

Mixing wastewater from a typical single-family residence with the recharge provided by yearly precipitation in Southern Deschutes County, it requires 2.5 acres for a standard system and 1.5 acres for a sand filter to maintain a recharge concentration at or below 7 mg/l. This estimate is on the conservative side because it does not account for inflow, outflow, or upflow from other areas.

Areas such as Fall River Estates, Wild River and Ponderosa Pines do not require as much acreage to achieve an adequate amount of mixing and dilution of nitrates because they are located in areas of higher precipitation at the western edge of the aquifer. Also, the aquifer gradient is steeper resulting in more dilution due to higher groundwater flow rates. La Pine and portions of Oregon Water Wonderland and Stage Stop Meadows subdivisions served by sewer systems are also not contributing to the overall nitrate-loading problem in the region.

C. Legislation.

In October 1998, Congress passed legislation to assist Deschutes County in purchasing a 540-acre tract of land from the Bureau of Land Management. This tract is located between La Pine and Wickiup Junction, west of Highway 97 and east of Huntington Road. A sewer line between the communities of La Pine and Wickiup Junction runs through the property.

This property is intended to be the site of a new neighborhood that will be serviced by sewer and water systems, and paved roads. Residential use will predominate, although community needs such as a senior center, library, assisted living facility and limited neighborhood commercial uses may be developed. A design process known as a “charette” occurred in November 1998. This design workshop occurred over a three-day period with the participation of over 80 people from the community.

The initial design encompasses a neighborhood primarily residential in character with sewer, water and a road network of paved streets and access roads without curbs. A setback of 300 feet from Highway 97 has been incorporated into the eastern boundary of the design. A senior center and assisted living facilities are included in the southern part of the property adjacent to the community of La Pine. This preliminary design will be evaluated to determine lot sizes and density, development costs, phasing of development and the ability to use transferable development credits as a tool for the overall development of the new neighborhood.

D. Transferable development credits.

A TDC (Transferable Development Credit) Program has been developed to redirect some of the future development of residential dwellings from lots served by on-site sewage disposal (septic) systems to the residentially zoned districts in the Neighborhood Planning Area in the La Pine UUC that will be connected to water and sewer systems.

A TDC is a severable interest in real property that represents the right to construct a single-family dwelling and an on-site sewage disposal system. The TDC program code has been adopted in compliance with the provisions of ORS 94.531.

The essential elements of the TDC program are to be codified in DCC Title 11, County Owned Land and Property, of the County Code. The TDC program is intended to redirect some of the future residential growth from existing subdivisions in South Deschutes County, also identified as the “sending area” where TDC's are allocated to eligible lots, into the Neighborhood Planning Area, also referred to as the “receiving area” where TDC's are required to be redeemed based on a net developable acreage formula. If successful the TDC program will reduce the overall impact from development in flood plains, wetlands, deer migration corridors and areas susceptible to groundwater pollution from nitrates. It will also help to maintain open space and preserve the rural character of the area by reducing the overall density of development that would otherwise exist in the future if a dwelling were built on every legal lot. In the sending area the TDC program will operate in a voluntary, market-driven manner. Those property owners who choose to sell their TDC's will retain ownership of the underlying land on which certain uses, such as camping, wood cutting, vegetation management, agricultural use and construction of a small storage structure will be allowed. A Conservation Easement will be placed on the property that will prohibit the construction of a single-family dwelling and on-site sewage disposal system on the property. Property owners who sell their TDC's and enter into a Conservation Easement restricting future uses on their property may elect to sell the deed for the underlying property to a willing buyer.

E. Public participation.

The RPS project has involved all aspects of the community, including property owners, interest groups, public agencies and government at the local, state and federal levels. Over 20 stakeholder meetings and 5 public forums were held. Eight newsletters and other mailings have been sent out to an extensive mailing list of property owners and other interested individuals, community organizations and local governments. The local press has covered this topic with a number of articles and news reports on several occasions.

According to written surveys the top three priorities for the residents of South Deschutes County are: (1) to retain open space to maintain the rural character of the area; (2) to not allow septic systems in areas of high groundwater; and, 3) to allow for experimentation with alternative methods of sewage disposal. Among the least favored options was extending sewer throughout the region due to the high cost associated with this expansion. However, several small sewer systems exist in the region and people commented and testified at public meetings and hearings that the option of using sewer systems to dispose of sewage should continue to be explored.

To ensure that public involvement was as great as possible regarding proposed amendments in 1998 to the comprehensive plan and zoning ordinance, an additional newsletter was mailed that contained a notice of public hearings before the Deschutes County Planning Commission and the Board of County Commissioners. The newsletter also described various aspects of the RPS program, characterized design elements of the new neighborhood as a result of the design charette and encouraged people to attend a community workshop held in early December to learn more about the amendments. This newsletter was mailed to over 5,000 property owners, including the owners of all lots in the RPS project area which are zoned RR-10 and less than 2 acres in size, and the stakeholders, interest groups, agencies, etc., who had previously participated or expressed an interest in the RPS project.

More detailed information about the RPS project including information on nitrates, experimental on-site technology, alternative solutions, transferable development credits and a bibliography of the studies and other sources of information used to analyze the region's problems and to formulate solutions was made available at the hearings.

F. LCDC Acknowledgement.

In September 2000 the Oregon Land Conservation and Development Commission (LCDC) conducted a hearing and approved the County's request to expand the La Pine UUC to include the area formerly recognized as the Wickiup Junction Rural Service Center and the New Neighborhood area. The Neighborhood area includes a tract of land the County purchased from the Bureau of Land Management and a privately owned parcel.

LCDC also approved the County's comprehensive plan designation and rezoning of the area added to the La Pine UUC from resource lands zoned exclusive farm use to various planning districts that allow for the creation of a residential subdivision served by municipal water and sewer systems and paved roads.

(Ord. 2002-009 §1, 2002; Ord. 2002-005 §1, 2002; Ord. 2000-017 §1; 2000; Ord. 98-085 §1; 1998)

**23.44.020. Goals.**

1. To preserve water and air quality, reduce wildfire hazards and protect wildlife habitat.
2. To ensure that domestic water derived from groundwater meets safe drinking water standards.
3. To develop an equitable, market-driven system, that reduces the potential development of existing lots in floodplains, wetlands, mule deer migration corridors and areas susceptible to groundwater pollution.
4. To create a new neighborhood, primarily residential in character, between La Pine and Wickiup Junction, that provides services efficiently, sustains economic development and reduces adverse impacts to groundwater quality in South Deschutes County.
5. To explore innovative sewage treatment and disposal methods.

(Ord. 2002-009 §1, 2002; Ord. 2002-005 §1, 2002; Ord. 2000-017 §1; 2000; Ord. 98-085 §1; 1998)

**23.44.030. Strategies.**

1. The County shall continue to work with landowners, citizens, community organizations and governmental agencies at the local, state and federal level to:
  - a. Continue collaborative work on the Regional Problem Solving project.
  - b. Develop, review and implement land use policies and development standards that will ensure that agreed-upon solutions from the RPS project are enacted to the maximum extent possible.

- c. Acquire land from the BLM between La Pine and Wickiup Junction, west of Highway 97, to develop as a new neighborhood.
  - d. Conduct feasibility studies regarding development of a new neighborhood. Such studies may include, but are not limited to: a master design plan, development costs and funding options, water and sewer system feasibility, traffic impacts, and zoning codes and governance issues.
  - e. Install and monitor innovative on-site sewage treatment and disposal (septic) systems on privately owned parcels in the RPS project area as part of the La Pine National Decentralized Wastewater Treatment Demonstration Project funded by the U.S. Environmental Protection Agency and in cooperation with the Oregon Department of Environmental Quality.
  - f. Work cooperatively with the U.S. Geological Survey and Oregon Water Resources Department during well water sampling and analysis to advance three-dimensional groundwater and nutrient fate and transport modeling in the south Deschutes County area.
2. The County shall implement and monitor in accordance with DCC 23.44.030(D), a Transferable Development Credit program as a means to redirect potential growth away from residential lots in subdivisions throughout the region into the La Pine Neighborhood Planning Area. The County shall establish a TDC Review Committee to assist in analyzing and recommending any changes deemed appropriate to the TDC program.
  3. The County shall continue to evaluate means to reduce nitrate loading from on-site sewage disposal systems by exploring innovative on-site sewage treatment and disposal technology, retrofitting of existing substandard or inappropriately located disposal systems, expansion of sewer systems, development of standards such as an effective lot area or variable lot area requirements, or other measures that will accomplish the goals.
  4. New residential subdivisions and partitions in the La Pine Urban Unincorporated Community shall be connected to a community water system and either the La Pine Special Sewer District sewage treatment system or a community waste water treatment facility that meets Oregon Department of Environmental Quality standards.
- (Ord. 2002-009 §1, 2002; Ord. 2002-005 §1, 2002; Ord. 2000-017 §1; 2000; Ord. 98-085 §1; 1998)