## Chapter 1: Abstract

The La Pine region of south Deschutes County and northern Klamath County in Central Oregon has seen significant increases in development pressures particularly over the last twenty years. Part of the pressure stems from the platting of large subdivisions made up of small one-half to one-acre lots that were marketed with no promise of basic services like improved roads or assurance that wastewater could be treated on site. Deschutes County Community Development Department recognized the issues facing the region and undertook an in-depth planning process, the Regional Problem Solving Project (RPS) in 1996. One of the issues discussed and investigated during this time was the issue of how do deal with wastewater treatment regionally and the effects of development on the prime drinking water aquifer underlying the region. As a result of the significant public opinion that onsite wastewater treatment options should be pursued instead of centralized sewer options because of economic, social and environmental reasons, Deschutes County, the Oregon Department of Environmental Quality (Oregon DEQ) and the US Geological Survey developed the work program that became the La Pine National Decentralized Wastewater Treatment Demonstration Project. The US Environmental Protection Agency funded Oregon DEQ to undertake the project with $5.5 million in 1999 to complete four main tasks:

1. field test denitrifying onsite wastewater treatment systems;
2. develop an onsite system maintenance structure;
3. perform groundwater investigations and develop a three-dimensional (3-D) groundwater and nutrient fate and transport model; and
4. establish a loan program to replace or retrofit failing or inappropriately located onsite systems.

This report includes the findings of the tasks listed above in addition to detailing the organizational and administrative work involved in completing the tasks. Describing the organizational and administrative work was seen as potentially beneficial to other organizations or agencies wishing to undertake similar activities.

The groundwater investigations have found significant existing nitrogen pollution and the 3-D model has predicted extensive future contamination of the aquifer. The model also predicted, based on the field performance of denitrifying systems in the project, that contamination could be slowed or stopped using onsite wastewater treatment technologies, and that, as the region is retrofitted with denitrifying technologies, the existing contamination would be flushed from the groundwater system via existing natural discharge points.

The field test program, in addition to identifying systems that can remove a large proportion of the nitrogen in residential wastewater, found that conventional systems are not protecting the aquifer from nitrate contamination. Conventional systems that were previously thought to denitrify up to 50% of the nitrate discharged from septic tanks were found to achieve significantly less denitrification when process and environmental variables were accounted for. Onsite systems were the focus of this project because of existing public feedback specifying the use of onsite systems and state rules which significantly limit the extension or creation of sewers outside urban growth boundaries.

The maintenance program structure developed by the county/state appointed advisory committee paralleled EPA's level 3 program from the voluntary national decentralized system management guidelines. As a result, critics may question the need to engage in such a lengthy process to develop a structure that had already been imagined. In this case, the value of the public process is in reaching and engaging a set of stakeholders that will ultimately help support regulatory proposals as they move through the public participation process related to rulemaking and then implementation.

The development of a loan program was dependent upon all of the preceding tasks. The field test identified systems that were available to solve groundwater problems and that would meet the intent of the loan program to protect and improve groundwater quality by upgrading failing or inappropriately located systems. However, state rules that allowed the use of nitrogen reducing systems for single family residences were not effective until March 2005 . Technologies and systems approved for use under the new rule did not start entering the market until after the effective date of the rule. The maintenance program, while the structure has been identified and portions placed into statewide rule, was not fully functional at the local level until at least a year after the effective date of the portion of the rule that requires certification of maintenance providers (March 1, 2006). The groundwater study and model have identified potential high risk areas, and the optimization model has undergone updates so that it will more accurately identify appropriate treatment standards for the 96 management areas in the sub-basin.

Overall, the La Pine National Decentralized Demonstration Project experienced tremendous success in the tasks that have been completed. Project staff have received positive feedback from the numerous presentations on the project and its findings at venues around the country. Future work planned for the region includes further work with the groundwater/optimization model as a planning/management tool, implementation of a pollution credit trading program, and expansion of the loan program. Information from this project contributed to revisions to the statewide onsite rule to allow more options for onsite systems used at the residential scale, implement maintenance requirements, and require certification of service providers. The region and the variety of issues involved warrant continued observation and attention as the tools and experience gained from the national demonstration project are applied locally.