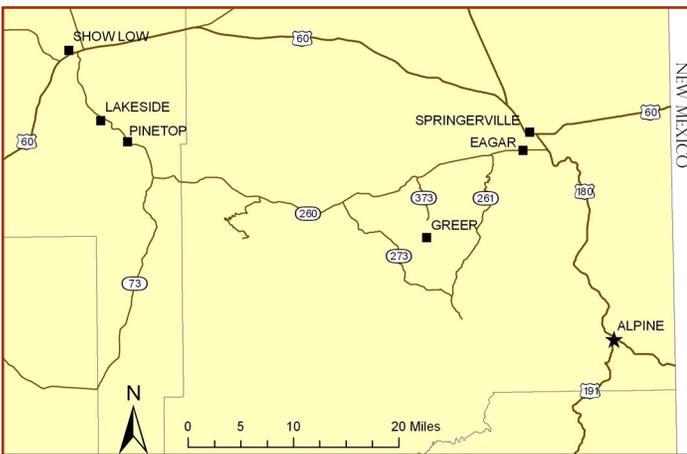


Septic Systems Permitting in Luna Lake/Alpine - Summer 2008

WATER QUALITY INVESTIGATIONS IN THE LUNA LAKE AREA

Alpine is an eastern Arizona community of about 600 residents, located in the vicinity of Luna Lake at the junction of U.S. 180 and U.S. 191. Alpine is just 6 miles west of the Arizona-New Mexico border and about 60 miles southeast of Pinetop-Lakeside, Arizona (see map below).



A study published by the Arizona Department of Environmental Quality (ADEQ) in 2000 identified water quality impairments at Luna Lake. This ADEQ study, known as a Total Maximum Daily Load (TMDL) study, determines the maximum amount of pollutants that a stream or lake can receive and still meet Surface Water Quality Standards (SWQS). A TMDL identifies the pollutants, the sources of the pollutants causing the water quality impacts, and the potential reductions that would be required for the water body to attain and maintain SWQS. The investigation identified the pollutants of concern at Luna Lake as pH, dissolved oxygen, total nitrogen, and total phosphorous. The study attributes, in approximate numbers, 36 percent of total nitrogen entering Luna Lake to septic system discharges, 20 percent to agriculture activities, 11 percent to elk herds, and the balance to forestry and other activities. ADEQ is working with the Arizona Game and Fish Department on improving management of the lake, including dredging, and with the Arizona Department of Agriculture and the U.S. Forest Service on improved land management practices.

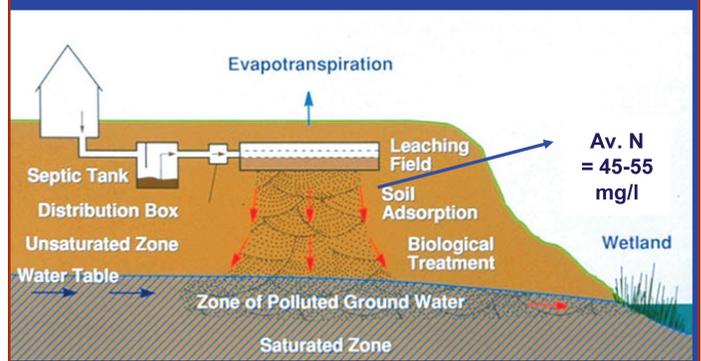
Septic systems remain a significant contributor of total nitrogen to Luna Lake that need to be addressed. High concentrations of total nitrogen above the regulatory standards have the potential to impact public health and the environment, and to spoil the natural beauty of the lake.

This impact could potentially limit the recreational and residential activities of this pristine area, and have the potential to lower property values in the area if not addressed. Luna Lake provides a wide array of recreational opportunities, and the impacts to these activities, such as boating, fishing, hunting, waterfowl watching and sightseeing would be impaired if nitrogen loading to the lake is not effectively controlled.

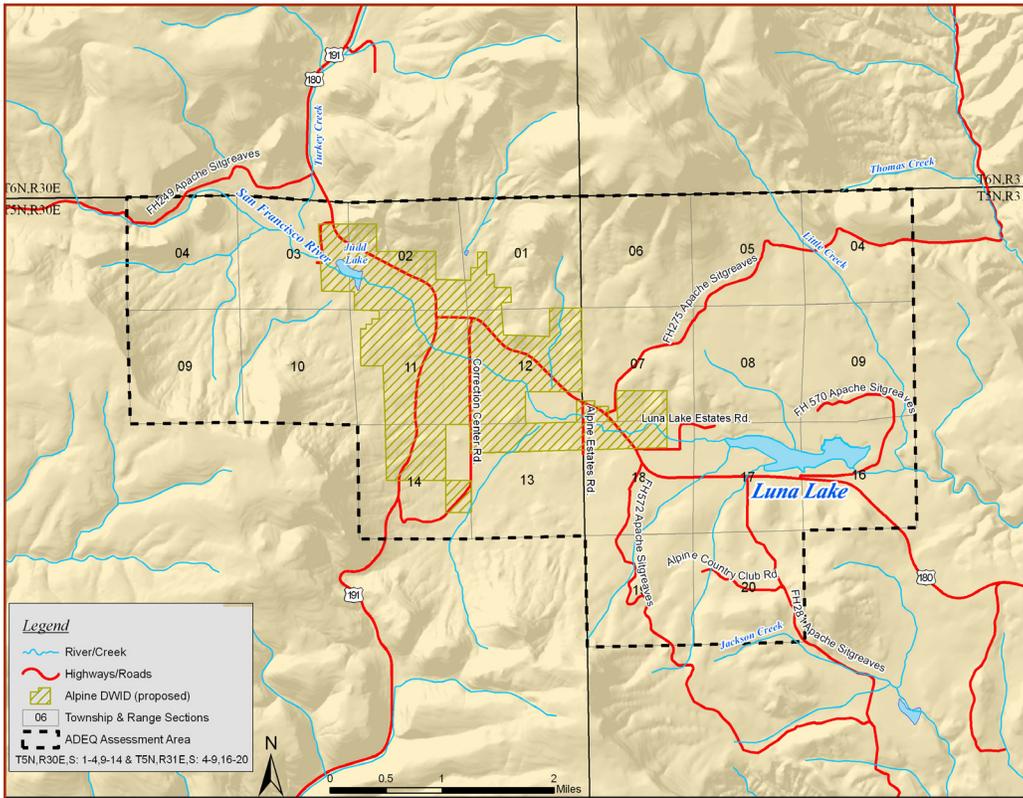
WHAT IS THE IMPACT OF SEPTIC SYSTEMS ON LUNA LAKE?

Excessive levels of nitrogen and phosphorus introduced into Luna Lake can increase production of algae and cause a rapid growth of lake vegetation. Algal blooms and large amounts of decaying algae consume oxygen in the lake water and can cause fish kills. Further, decomposition of the lake vegetation growing as a result of the nutrient inputs consumes large amounts of oxygen resulting in fish kills, an increase in pH and consequently formation of ammonia which is highly toxic to fish and aquatic life. Excess total nitrogen can also leach into the groundwater and affect drinking water wells.

Example: Septic Systems and Nitrogen and Viral Loading



Conventional septic systems use antiquated, 19th century treatment technologies. Wastewater enters the first chamber of a septic tank, allowing solids to settle and scum to float (see septic system diagram). Liquid waste flows through a dividing wall into a second chamber of the tank where further settlement takes place, with excess liquid then draining from the outlet into the leach field. From the leach field, contaminants in the liquid waste seep into the soil and can negatively impact local groundwater and connected



adopt nitrogen-reducing onsite wastewater treatment systems instead of traditional septic systems will require the cooperation of the entire community, including lot owners and developers. The review and permitting of all nitrogen-reducing onsite wastewater treatment systems in the prescribed assessment area defined by ADEQ (see Alpine region map on left) will be conducted by ADEQ. Please send all applications for such permits within this assessment area to:

ADEQ: Water Quality Division
 Engineering Review Desk
 1110 W. Washington St.
 Phoenix, AZ 85007

All permit applications must include the appropriate form, fee and a detailed site investigation performed by a qualified person

surface waters. Conventional septic systems do not adequately treat wastewater or otherwise remove contaminants such as total nitrogen. In contrast, there exist several alternative nitrogen-reducing onsite wastewater treatment systems that effectively reduce the nitrogen and bacteria, thus limiting adverse water quality impacts.

LONG TERM MITIGATION STRATEGY

ADEQ is working with the Apache County Health Department and the Alpine Sanitary District (proposed to be the Alpine Domestic Water Improvement District), to put in place regulatory measures that would restrict the amount of nitrogen discharged in or near Luna Lake and the San Francisco River. The long term goal is to reduce the total nitrogen impact from septic systems by connecting as many residential and commercial facilities to the sewer collection system for the District's wastewater treatment facility as possible. The Alpine DWID is currently developing a sewer master plan that will allow many previously unsewered areas in the region to be connected to sewer and to limit further nitrogen discharges.

INTERIM MITIGATION STRATEGY

ADEQ is currently recommending that any new developments in the Luna Lake area be connected to the existing sewer collection system if possible. If the opportunity to connect to sewers is not available, any new septic systems should incorporate the use of nitrogen reducing technologies to limit the impacts to Luna Lake. This voluntary effort to

that incorporates the following information:

- Slopes, rock outcropping, and fill material
- A floodplain analysis
- A setback analysis
- Appropriate system selection
- Soil characterization (down to 12 feet)
- Percolation test method
- Seepage performance test method
- Seasonal high water table data

The ADEQ site investigation form can be obtained at www.azdeq.gov/environ/water/permits/download/investigation.pdf

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