

Spray Irrigation of Treated Wastewater

A Sensible Approach to Wastewater Management

Promoting Beneficial Reuse of Reclaimed Water

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What is Spray Irrigation???

- Reuse and Recycling of Treated Wastewater
- Controlled application of treated wastewater (Reclaimed Water) onto vegetated land surface
- Application rate based on crop nutrient needs
- Nutrients in reclaimed water used to grow crops
- Level of wastewater treatment based on reuse type:
 - Restricted Public Access Sites
 - Limited Public Access Sites
 - Unlimited Public Access sites

Typical Waste Water Characteristics

Parameter	Prior to Treatment		Treated WW/ Prior to Spray Irrigation		3 feet Below the Soil Surface	
Nitrogen	50	mg/L	25	mg/L	<5	mg/L
Phosphorus	12	mg/L	8	mg/L	0	mg/L
Fecal Coliforms	>1,000,000	col/100mL	10 - 200 *	col/100mL	0	col/100mL
BOD	250	mg/L	10 - 50 *	mg/L	0	mg/L
TSS	220	mg/L	10 - 50*	mg/L	0	mg/L
Chlorides	30	mg/L	30	mg/L	30	mg/L

*** The lower concentrations must be met if the public may come into contact with the reclaimed water, such as in Golf Course Irrigation**

Benefits of using reclaimed water include:

- Aquifer recharge
- Reduces current demand on aquifer
- Keeps water in watershed
- Maintains Open Space
- Preserves agricultural lands
- Reduces agricultural operating costs
- Reduces import of nutrients to Watershed
- Alternative to Surface Water Discharge
- Helps protect surface water quality

Types of Beneficial Reuse

- Agricultural Applications
 - Dedicated Ag Sites
 - Voluntary Ag sites
- Irrigation of Wooded Tracks
- Irrigation of Residential Lawns
- Irrigation of Open Spaces
- Golf Course Irrigation



Agricultural applications

- Irrigate fields
- Supply supplemental nutrients
- Promotes fertigation
- Nutrient content of reclaimed water is known
- Nutrient application based on crop needs
- Conventional irrigation equipment used, such as:
 - Center pivots
 - Traveling guns
 - Solid set sprinklers



Agricultural Benefits to Using Reclaimed Water

- Provides supplemental nutrients
- Provides water at pressure suitable for irrigation
 - Reduces electrical and equipment costs
 - Reduces demand on ground water supply
- Available even during drought restrictions
- Improves crop yields
- Allows for accurate nutrient loading rates, at all stages of crop growth (FERTIGATION)

Types of Agricultural Reuse Sites

- Dedicated Agricultural Reuse Sites
 - Purchased by WWTF, or long-term contract
 - Maximize hydraulic loading rates
 - Year-round application
 - Grass and hay, or grain crops
 - Monitoring wells required
 - Buffers to property lines, surface waters
 - Public access restricted
 - Ag. field is permitted
 - Secondary treatment required
 - ~125 to 150 acres of irrigatable land needed per MGD

Types of Agricultural Reuse Sites (continued)

- Voluntary Agricultural Reuse Sites
 - All activities controlled by farm manager
 - Hydraulic loading rates based on crop needs
 - Most crops can be grown
 - Only prohibition is on crops that will be consumed raw
 - Tertiary treatment is required (Unlimited Public Access Criteria)
 - Minimal buffers
 - No public access restrictions
 - May use lands under Ag Preservation

Agricultural Land Preservation

- 2005 MOU between DNREC and DDA encourages Spray Irrigation on Ag Preservation Lands:
 - For production of conventional cash crops
 - Requires treatment to Unlimited Access levels
- Irrigation Preservation Task Force
 - House Concurrent Resolution No. 67 (July 2008)
 - Preservation of Agricultural lands
 - Preserve ground water resources
 - Maintain/improve farming economy
 - Promote utilization of reclaimed water on farm
 - Report to General Assembly by January 15, 2009

Beneficial Reuse in Delaware

- Started in the 1970's
- Currently, 24 permitted spray irrigation facilities
 - Sussex County operates 3 Regional Spray Irrigation Facilities in Inland Bays Basin
- 3100 acres of land currently permitted
- Over 200 individual, and community drip irrigation systems currently in use
- Applied to agricultural sites, golf courses, wooded tracks, open spaces and residential lawns
- 650,000 pounds of Nitrogen and 210,000 pounds of Phosphorus reclaimed through reuse in 2007

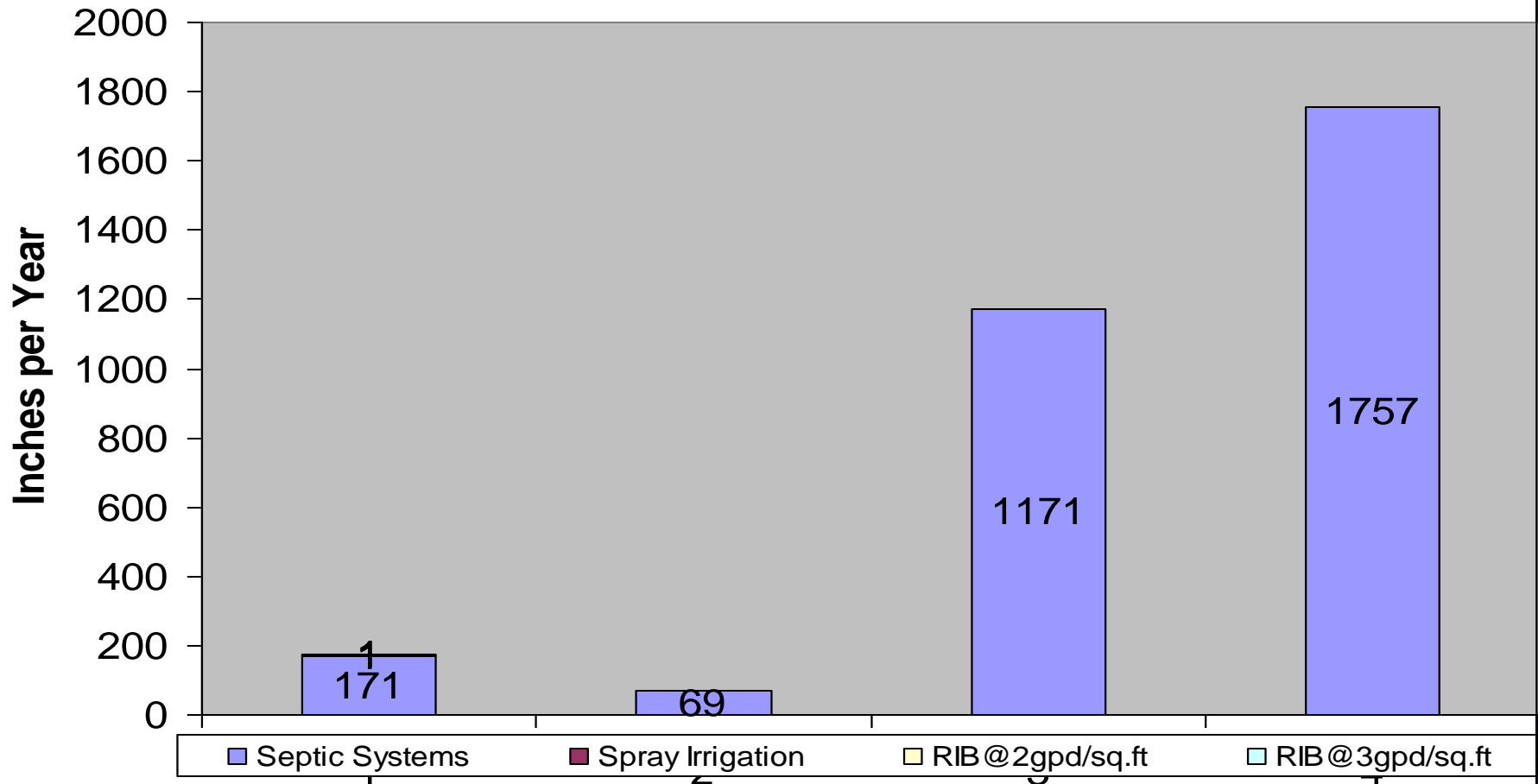
How Land Treatment Systems Reduce Nutrient Loads and Help Meet TMDL Goals

- Agricultural Setting
 - Nutrients supplied by treated wastewater
- Nutrient loading rates are limited, matched to crop uptake needs
- Nutrients are applied in small quantities, over time
 - Maximizes nutrient uptake, reduces loss to water table
- Vegetated buffers reduce erosion and runoff
 - Phosphorus control
- Eliminates Surface Water Discharges
- Wastewater runoff is prohibited

Ground Water Considerations

- Impact to Ground Water
 - Improve ground water quality under site
 - Promotes local recharge of aquifer
 - No mounding of water table
 - Verified through on site ground water monitoring
- Comparison with Disposal Options
 - Hydraulic Loading Rates

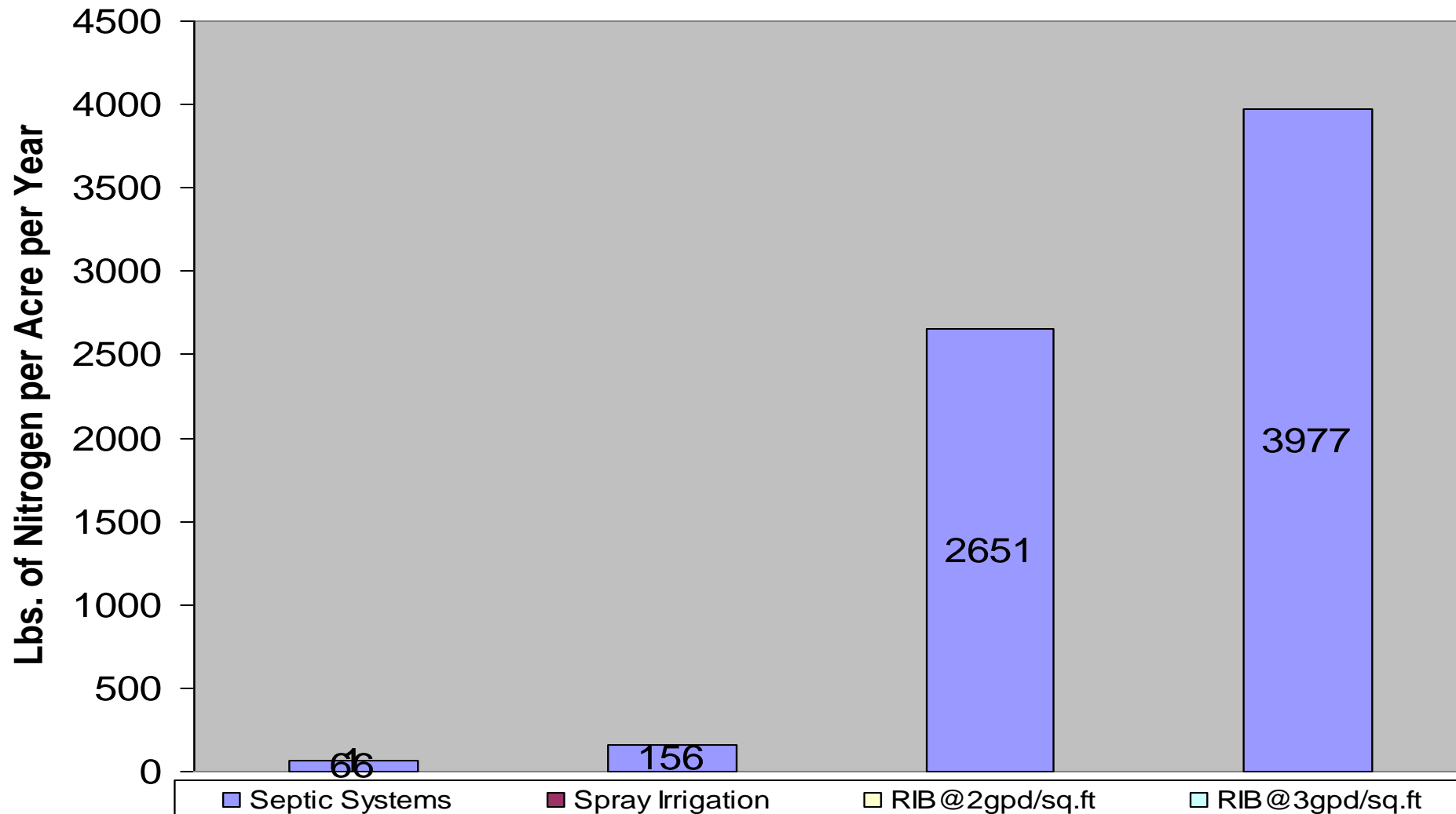
Comparison of Hydraulic Loading Rates for Various Wastewater Disposal Options



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- Impact to Ground Water
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- Comparison with Disposal Options
 - Hydraulic Loading Rates
 - Nitrogen Loading Rates

Comparison of Nitrogen Discharge Rates for Various Wastewater Disposal Options



Is Spray Irrigation Suitable for Rehoboth Beach?

- Seasonal Flows
- Level of Wastewater Treatment
- Storage Requirements
- Availability of Agricultural Lands
- Alternative Reuse Options
 - Horticultural Uses
 - Irrigation of Recreational Areas
 - Golf Course Irrigation

Future uses of reclaimed water in Delaware

- Eliminate current surface water discharges
- Wetland restoration / Wetland creation
- Greenhouse production of ornamental flora
- Residential and commercial lawn watering
- Grey water reuse
- Only limited by our imagination

Thank-you

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