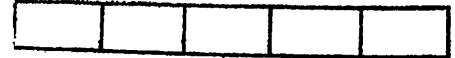


Glenda Wiles

MAR 15 2019

From: Mace Mangold <mmangold@wgmgroup.com> **Revalle County Commissioners**
Sent: Tuesday, March 12, 2019 1:49 PM
To: Mace Mangold
Cc: Brent Campbell
Subject: WGM's Treatment Wetlands Can Increase Lagoon Capacity & Improve Performance
Attachments: Treatment Wetlands Municipal.pdf



Good morning,

WGM Group is proud to welcome Senior Scientist Chris Allen to our growing team.

Chris obtained his PhD in Environmental Engineering from Montana State University (MSU) investigating nitrogen transformations and their removal from treatment wetlands. Beginning in 2009 he has researched and developed wetland treatment systems that provide cost-effective, scalable treatment for domestic wastewater and nitrate abatement.

Chris has joined the WGM Group team to expand the planning and design firm's environmental and water resource service line offerings. Located in the Bozeman office, he'll be working with WGM team members across the state to offer clients high-performance option for enhancing existing municipal treatment systems.

Treatment wetlands use biological processes for enhanced nitrogen removal, offering a cost effective alternative to expensive manufactured units. Designed to exceed standard Level 2 treatment, they remove 98% of biological oxygen demand (BOD) and 70-75% of total nitrogen.

I've attached a cut sheet with more details on the benefits of treatment wetlands. Give me a call at 406-399-2854 or email me at mmangold@wgmgroup.com if you'd like to start a conversation about how these systems can increase capacity and save costs.

**Best regards,
Mace Mangold**



Mace Mangold, P.E., LEED AP
Senior Project Engineer

CELL: 406-399-2854
EMAIL: mmangold@wgmgroup.com
ADDRESS: 109 E. Main St. Ste B, Bozeman, MT 59715

Treatment wetlands use biological processes to increase year-round nitrogen removal and increase current lagoon capacity.

Treatment wetlands can be added to existing lagoon systems to increase capacity, and have been proven to enhance winter nutrient removal in cold climates. A robust system can often be sited within periphery land space, and save costs on maintenance and operations throughout the year.

Designs can be customized to site-specific challenges, including biological oxygen demand (BOD) removal, winter ammonium removal, and year-round nutrient removal.

WGM Group Senior Scientist Chris Allen has been actively researching, designing and implementing treatment wetlands for the past decade. His experience as a researcher at Montana State University has given him insight into how these systems can improve performance and save costs. Contact Chris at callen@wmggroup.com to learn more about their potential.

- Provides winter ammonium removal.
- Increases year-round nutrient removal.
- Increases plant capacity and/or decreases aeration costs.
- Low operating costs.
- Requires little annual maintenance.

