

# USA – MSU – High Strength Wastewater



## DESCRIPTION

The US pilot is specifically tailored for the treatment of high-strength domestic wastewater in a sub-freezing winter climate and is housed at the Bridger Bowl Ski Area near Bozeman, Montana. The ski area receives approximately 5 m of annual snowfall. The pilot receives wastewater from base area lodges during the ski season, from December to April, with water temperatures of 2–4 °C. The primary purpose of the two-stage treatment wetland is removal of carbon and total nitrogen.



## DESIGN AND PERFORMANCE

### Type of influent

High-strength domestic wastewater from ski lodges including lavatories and kitchens.




### Design criteria

- Two-stage subsurface vertical flow system with recirculation and partial saturation to promote both carbon and nitrogen removal.
- Overall COD removal was >95%, TN removal was >70%, and ammonia removal was >97%.
- Thirty-eight micropollutants were detected in the influent, with 6 of those removed to below detection in the effluent.

### Climatic conditions

The system operates during the winter ski season from December through April, when it is necessarily covered with snow and plants are dormant. The water temperature ranges from 2.5 – 5 °C

### Challenges

-  Winter conditions require snow removal
-  Freezing temperatures can cause damage to equipment
-  Seasonal operation limits the time available for optimization and data collection



## CO-BENEFIT

- The most likely co-benefits and those of most interest to stakeholders are environmental education, reduction of energy demand and the aesthetic value of the TW.