

ASSINIBOINE RIVER DIVERSION FAILSAFE

*Fourteen Years' Experience Armoring of a Critical Flood Control
Structure Utilizing TRM Technology*



As presented
International Erosion Control Association Annual Conference
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Las Vegas, Nevada

Tensar.

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Unearthing better results.



Jill Pack, CPESC
Manager of Technical Services
Tensar North American Green



Ian Corne, CPESC, M.Land.Arch., B.E.S.
Application Specialist – Erosion and Sediment Control
Nilex Civil Environmental Group

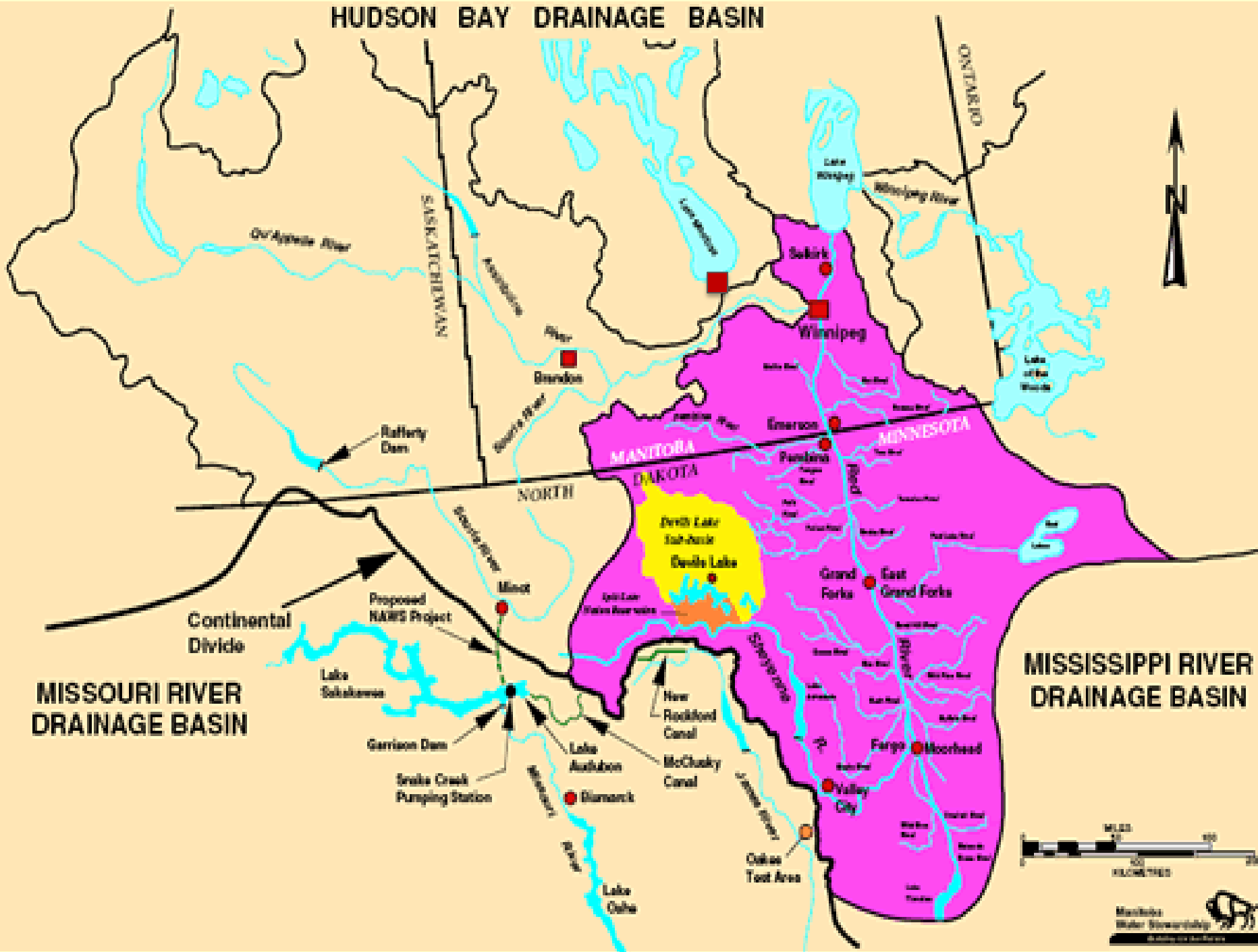


Assiniboine River
Diversion





HUDSON BAY DRAINAGE BASIN





Shellmouth
Reservoir

Assiniboine
River
Diversion

Red
River
Floodway

Manitoba

North Dakota

Minnesota



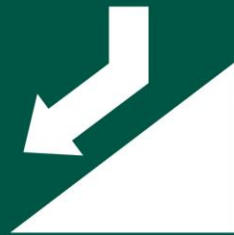












4. FLOOD EVENT CHRONOLOGY

The Assiniboine River Diversion was completed in 1970 and experienced seven overtopping events before TRM armouring in 1997. Post armouring, six flood events have occurred as follows:

Year	Diversion Flow	Overtopped	Performance
1999	481 m ³ /sec (17,000 ft ³ /sec)	Overtopped	Performed
2001	538 m ³ /sec (19,000 ft ³ /sec)	Overtopped	Performed
2005	566 m ³ /sec (20,000 ft ³ /sec)	Overtopped	Numerous Breaches
2007	340 m ³ /sec (12,000 ft ³ /sec)	Limited Overtopping	Performed
2009	595 m ³ /sec (21,000 ft ³ /sec)	Overtopped	Limited Breaches 300mm (12") angular riprap section conveyed
2011	963 m ³ /sec (34,000 ft ³ /sec)*	Overtopped	Limited Breaches

*While the majority of the diversion runs at this rate, the area in the vicinity of the failsafe runs a reduced capacity of 425 m³/sec (15,000 ft³/sec). (See section 3.1.1 'Diversion Channel')

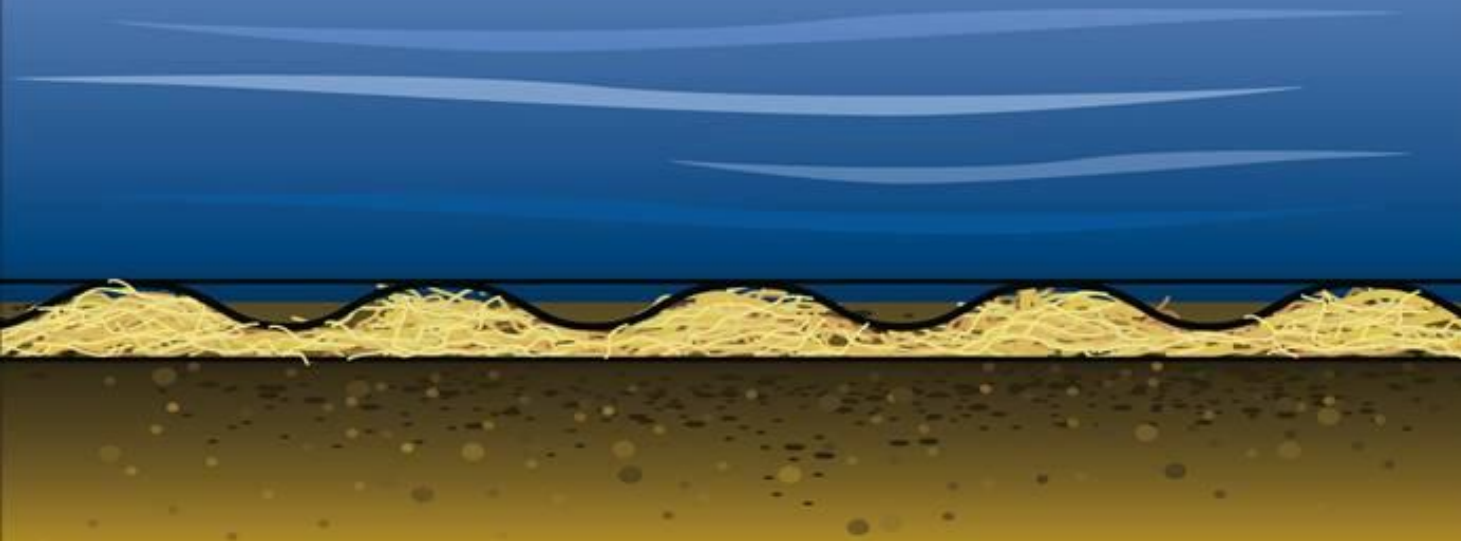








150 Pascal
3.2 lbs/ft²





480 Pascal
10 lbs/ft²



575 Pascal

12 lbs/ft²



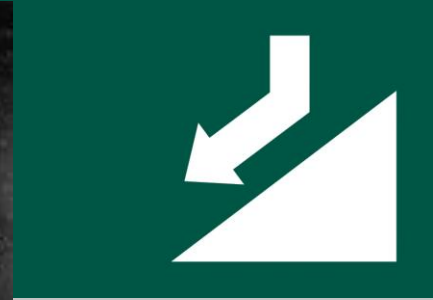












































20 fps at 18" depth





















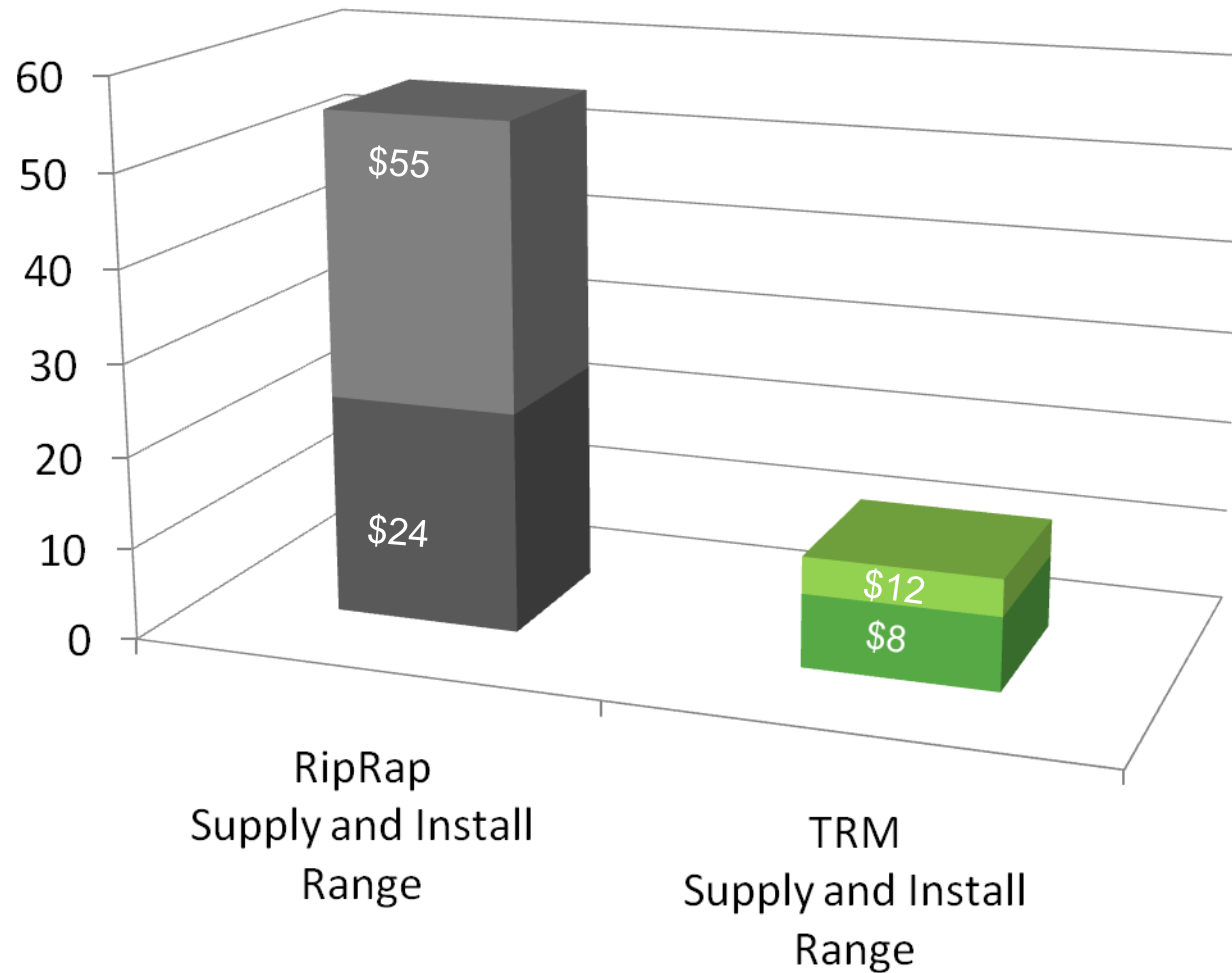








Reliable Design for LE\$\$































Unearthing better results.











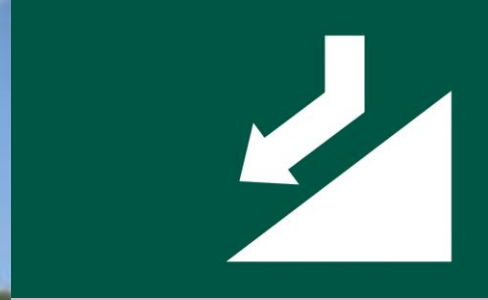


Lessons Learned

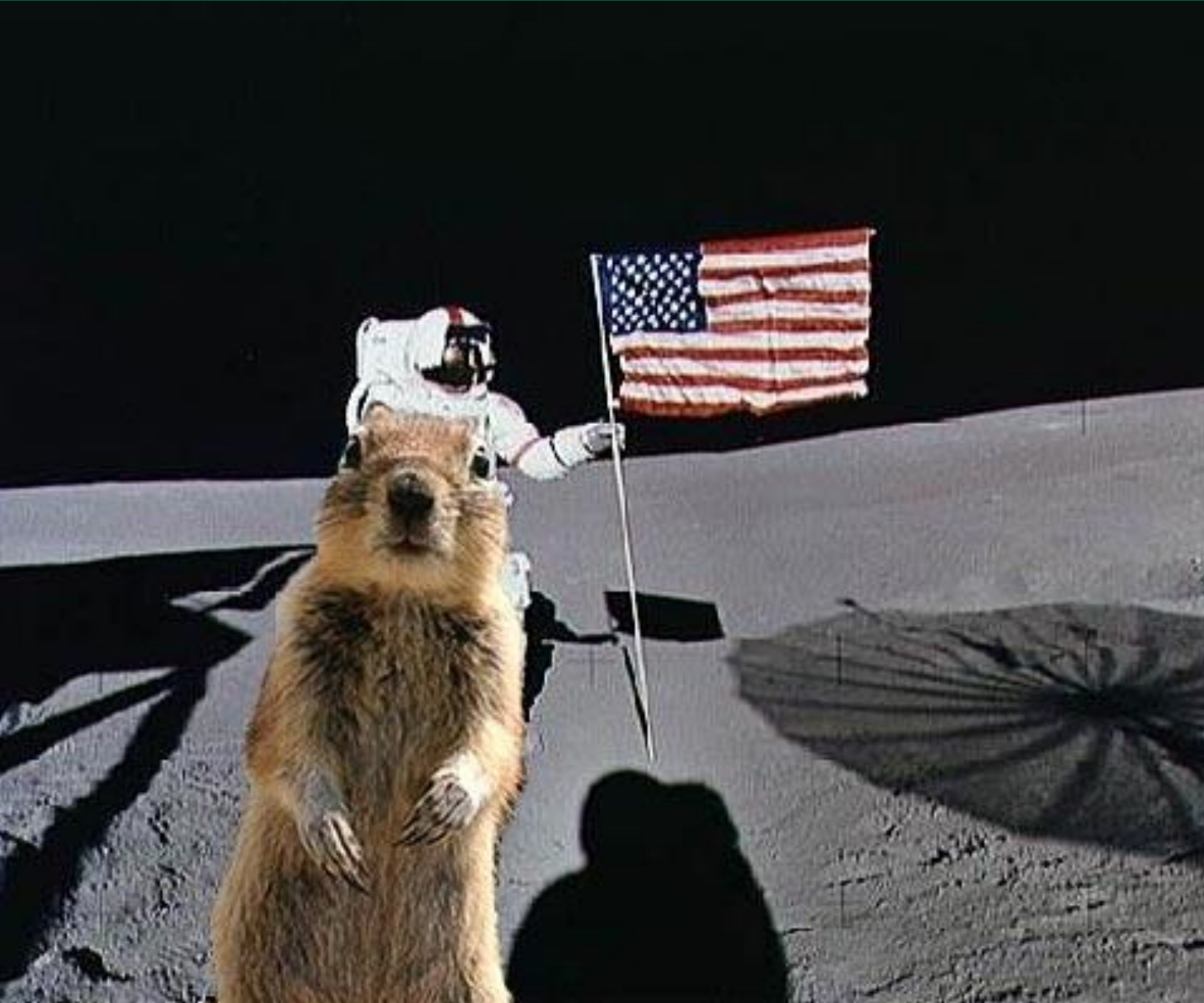
- 'Internal Erosion' failure mechanism
- Plastic mesh limitations
- High performance in numerous overtopping especially in the 2011 360 year event
- High Performance in lieu of rock riprap
- Wet side unvegetated TRM performance
- Cost effective







pollution mitigation / sediment retention
permanent
channel section
reliable channel design



Acknowledgements



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Tensor North American Green

Nilex Management

