



Building *Sustain*Able Communities

November 15th-18th, 2010

**Delta Grand Resort & Conference Centre
KELOWNA, BC**

Constructed Wetlands

Curt Kerns, M.S., R.P.Bio., C.F.S.

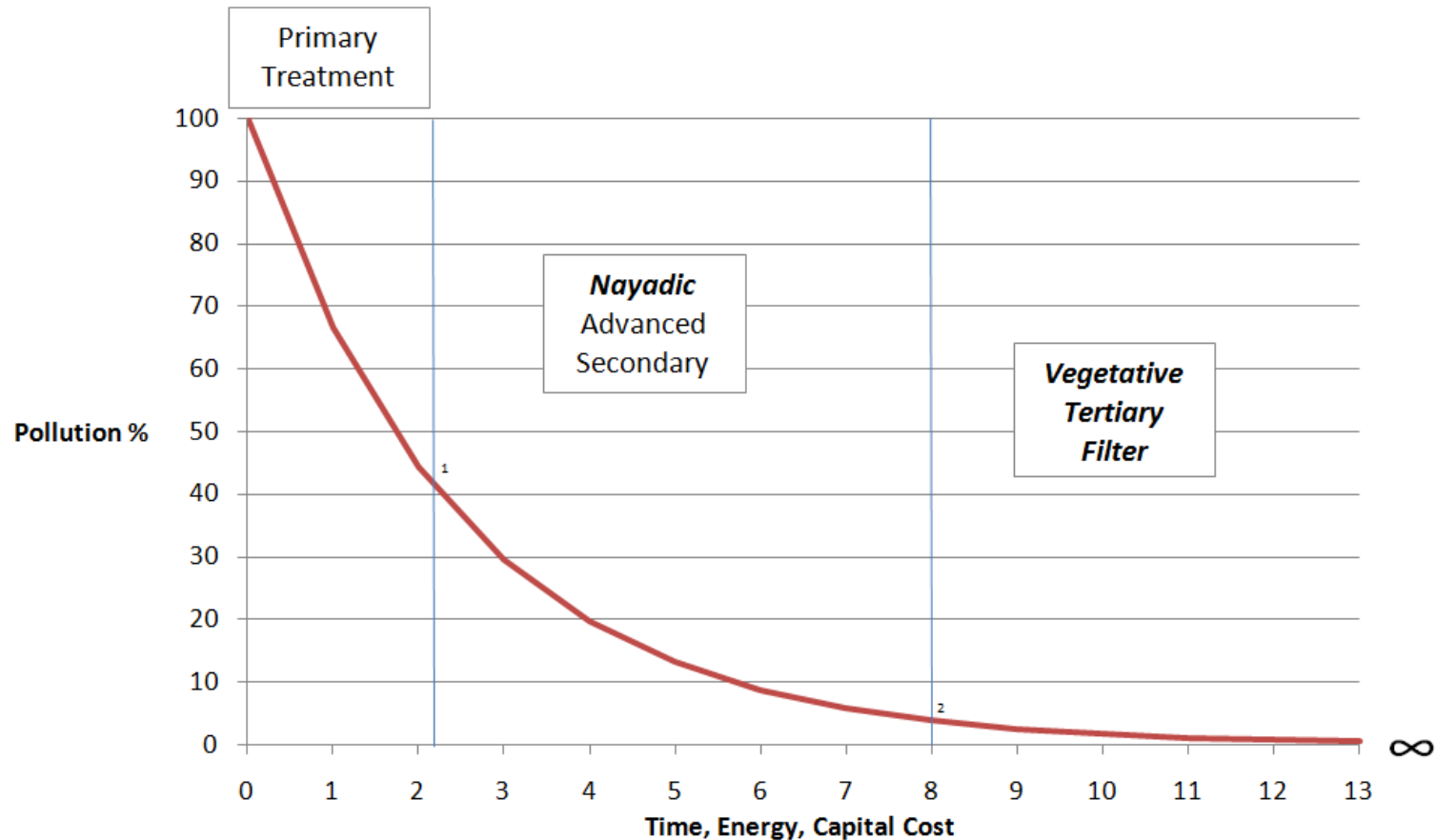
www.wetlandspacific.com

Types of Constructed Wetlands

- Free Water Surface
- Vegetated Submerged Bed
- Lineal
- Stormwater
- *Vegetative Tertiary Filter*

Exponential Decay Function

Wastewater treatment follows an exponential decay function



1. 58% reduction. Source: Bounds, TR, 1997, Design and Performance of Septic Tanks: Site Characterization and Design of Onsite Septic Systems, ASTM STP 901. M.S. Bedinger, A.I., Johnson and J.S. Fleming, Eds., American Society of Testing Materials.

2. 96% reduction. Source: NSF International. Report on Evaluation of Nayadic Inc. Model M-6A 90/060/700/2472/447-I under the provisions of NSF Standard 40 on Individual Aerobic Wastewater Treatment Plants.

Wetlands Have A Myriad of Functions

- Remove and detoxify substances carried by and dissolved in water including POPs
- Nutrient & carbon sinks
- Sequester heavy metals
- Slow water release from storm events
- Recharge aquifers
- Vital wildlife habitat
- Express human and economic values

Arcata Marsh and Wildlife Sanctuary, Wetlands



Design Population	20,000 persons
Average Annual Flow	8,700 m ³ -day (2.3 mgd)
Peak Flow	7x
BOD Loading	1,900 kg-day (4100 lbs/day)
TSS Loading	1,500 kg-day (3400 lbs/day)
Treatment Marsh Area	3 ha 7 gal/ft ² -day
Constructed Wetland Area	12.5 ha 1.7 gal/ft ² -day
Total Area per Capita	8.2 m ² /person-day

Constructed Wetland, Arcata, Calif



Source: Photo by Curt Kerns

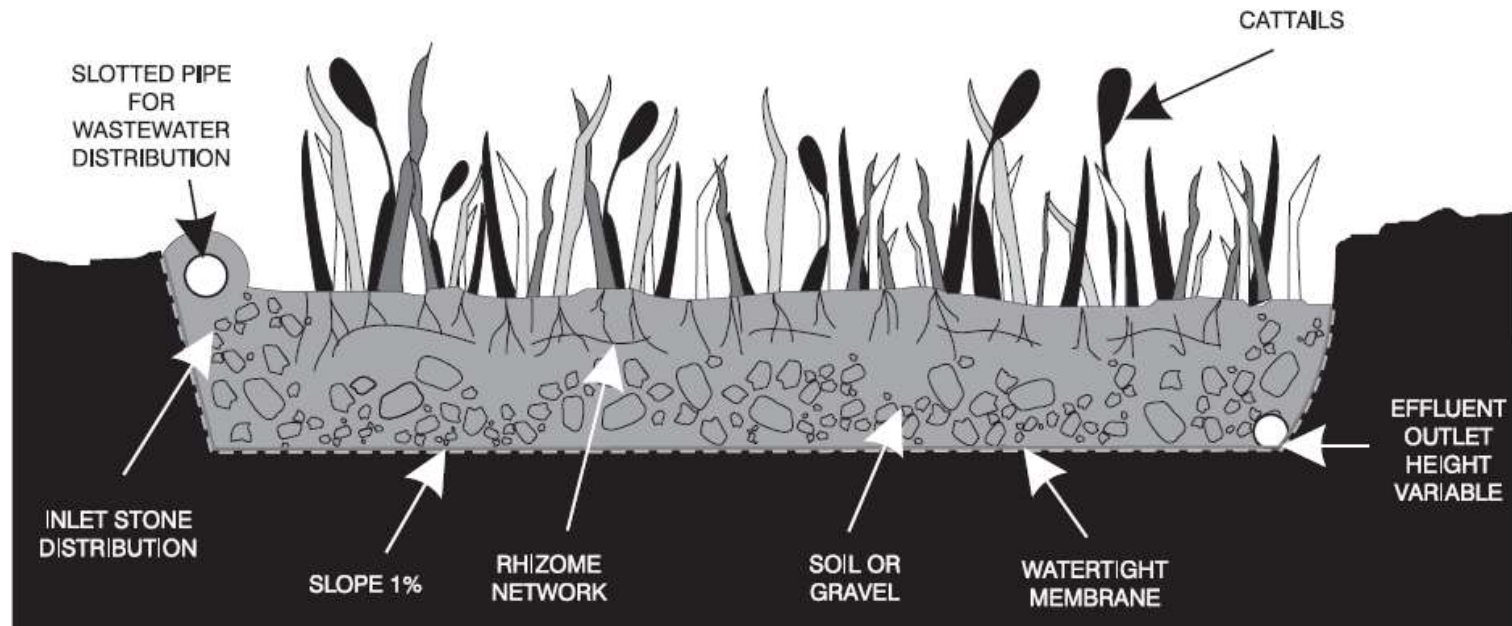


Over 200,000 visitors per year



A young visitor

Vegetated Submerged Bed



Source: Toms Creek Project, VA.

Lineal Constructed Wetland with Arrowhead



Sagittaria sagittifolia

Stormwater Wetland, Arcata, CA



Vegetative Tertiary Filter



Vegetative Tertiary Filter

When used in residential wastewater treatment, valuable yard space can be saved with the *VTF* as well as protecting the environment with the highest quality discharge, that of non-detectable BOD₅/FC



VTF at planting in 2003



VTF in 2007

Vegetative Tertiary Filter



VTF in 2010, seven years after planting
Now over 10-times its original size