

Biochar Challenges and Opportunities in the Stormwater Market

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From an Industrial Clients Perspective

Regulation changes – higher standards

- Industrial Sites – 1200 in Washington
- Around industrial 824 in Oregon + sand/gravel & construction

Parameter/Benchmarks	Oregon		Washington
	1200-COLS	1200-Z	ISGP
Total Copper (µg/l)	36	20	Western WA: 14 Eastern WA:32
Total Lead (µg/l)	60	40	---
Total Zinc (µg/l)	240	120	117
Total Suspended Solids (mg/l)	50	100	---
Oil and Grease (mg/l)	10	10	No visible sheen
Total Phosphorus	160 µg/l	---	---
Turbidity (NTU)	---	---	25
pH (SU)	5.5-8.5	5.5-9.0	5.0-9.0
BOD ₅ (mg/l)	---	33	---

From an Industrial Clients Perspective - Challenge

- What do you do?
- Industrial stormwater is highly variable
- Industrial clients can choose any treatment technology
- However, clients seek Ecology approval
 - Easier approval using TAPE approved technologies



From an Industrial Clients Perspective - Opportunity

- Highly variable stormwater quality
- 2065 facilities fall under the industrial permit

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Example:

Log Yard Client

Biochar uses

- Filtration
- Soil Amendment
- Production

From an Municipal Clients Perspective

- Different permit than industrial
- Must use TAPE approved technology for new development and redevelopment projects



- A biochar treatment technology needs to be TAPE approved

From an Municipal & Industrial Clients Perspective - Opportunity

Other water treatment uses

- Biochar use in constructed wetlands



Constructed Wetlands:

- Tertiary Treatment
 - Temperature
 - Metals
 - Nutrients
 - Emerging contaminants

From an Municipal & Industrial Clients Perspective - Opportunity

Biochar:

- Surface wetland soil amendment
- Subsurface wetland media

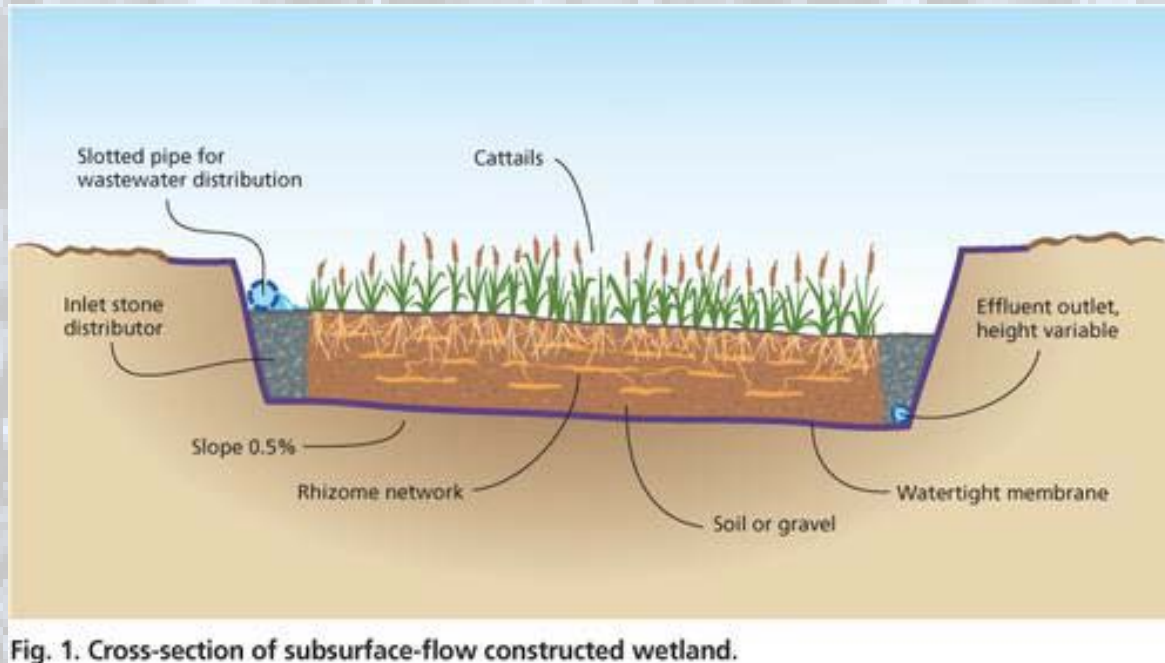


Fig. 1. Cross-section of subsurface-flow constructed wetland.

Conclusions

Biochar Challenges:

1. Treat highly variable wastes
2. Become a proven or TAPE technology

Biochar Opportunities:

1. 2065 industrial facilities under permit WA & OR
2. Municipal new/redevelopments slow start
3. Demonstration Projects
 - WSU Puyallup
 - Log Yards
 - Constructed Wetlands

The End