

Ecological Engineering Education and Practice in the US

David Austin (CH2M), David Tilley (University of Maryland), Tess Wynn-Thompson (Virginia Tech)

Topics for today

- ▶ American Ecological Engineering Society
- ▶ US ecological engineering education
- ▶ Example ecological engineering practices in the US



*The **mission** of the Society is to promote ecological design for the common benefit of society and nature.*

The **core values** of the Society are as follows:

1. Integration of ecological principles and engineering practice;
2. Professional development through lifelong learning, career mentoring, and certification;
3. Advancement of our understanding of ecological engineering through research and practice; and,
4. Education of and outreach to future professionals, decision-makers, and the public.

The **focus areas** of the Society are as follows:

1. Advancement of ecological engineering in research, practice, and policy;
2. Communication of advancements in ecological engineering;
3. Standardization of ecological engineering curricula; and,
4. Professional certification for ecological engineering.

http://ecoeng.org/about_aees/about_aees_index.htm

Are we successful?



1. Advancement of ecological engineering in research, practice, and policy;



2. Communication of advancements in ecological engineering;



3. Standardization of ecological engineering curricula; and,



4. Professional certification for ecological engineering.

Annual Conference

Workshops



Tours



Technical Presentations

Poster Sessions



Student Design Competitions

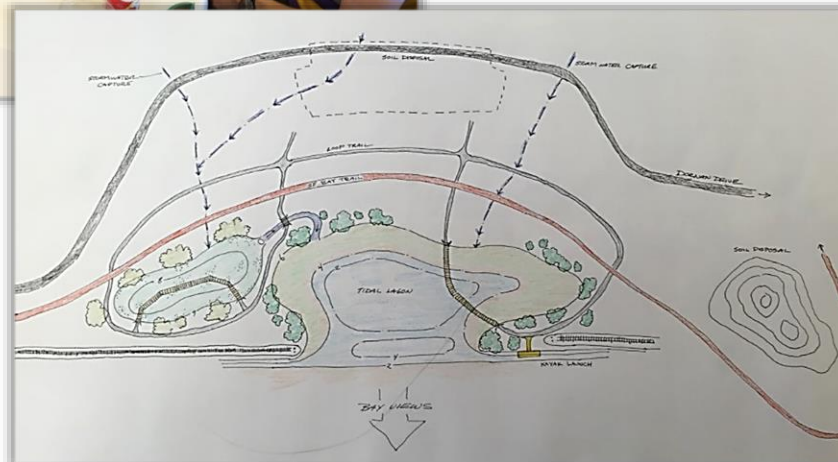
Student Travel Grants

Certified Ecological Designer Program

- ▶ Promotes an integrated practice
- ▶ Open to all interested practitioners, such as
 - ▶ ecology
 - ▶ engineering
 - ▶ landscape architecture
 - ▶ architecture
 - ▶ planning
- ▶ Two certifications offered:
 - Certified Ecological Designer (CED)
 - Associate Ecological Designer (AED)
- ▶ Certification requires expertise in the integration of ecology and design as demonstrated by:
 - Academic credentials
 - Completed (constructed) projects
 - Active participation in AEES-sponsored CED workshop

<http://ecoeng.org/certification/certification.html>

CED Workshop consists of lectures, field trips, and a design problem



Examples of ecological engineering practice in the US:



Stream Restoration

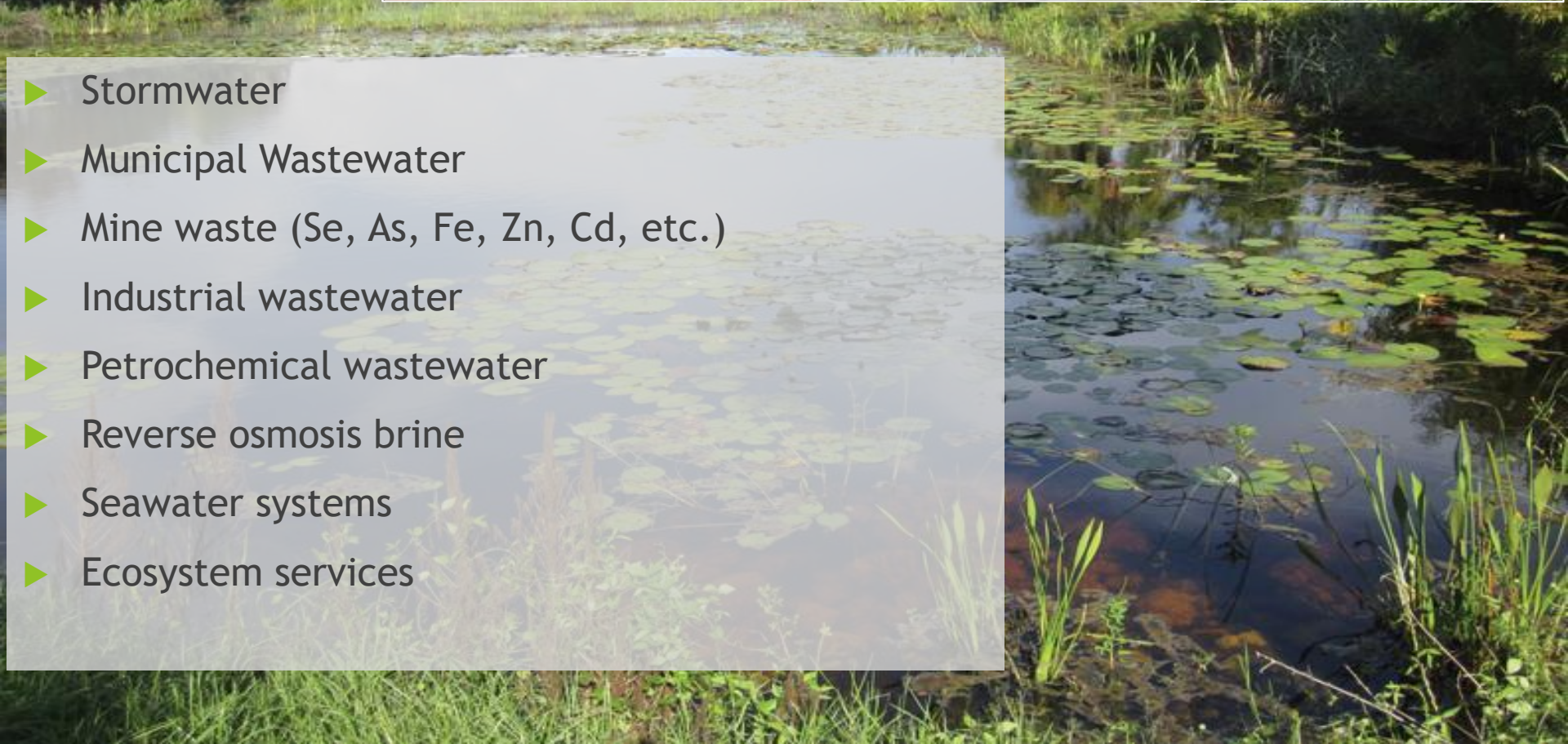


Green Infrastructure



**Wetland Creation
(mitigation)**

Treatment wetland types



- ▶ Stormwater
- ▶ Municipal Wastewater
- ▶ Mine waste (Se, As, Fe, Zn, Cd, etc.)
- ▶ Industrial wastewater
- ▶ Petrochemical wastewater
- ▶ Reverse osmosis brine
- ▶ Seawater systems
- ▶ Ecosystem services

Brownfield reclamation



Phytoremediation



Site reclamation

Before



Future (Conceptual Rendering)



Construction of Lined Seasonal Wetland Depression



Early Establishment - Upland



Irrigation ecotechnology

Owens Lake, California before saline irrigation

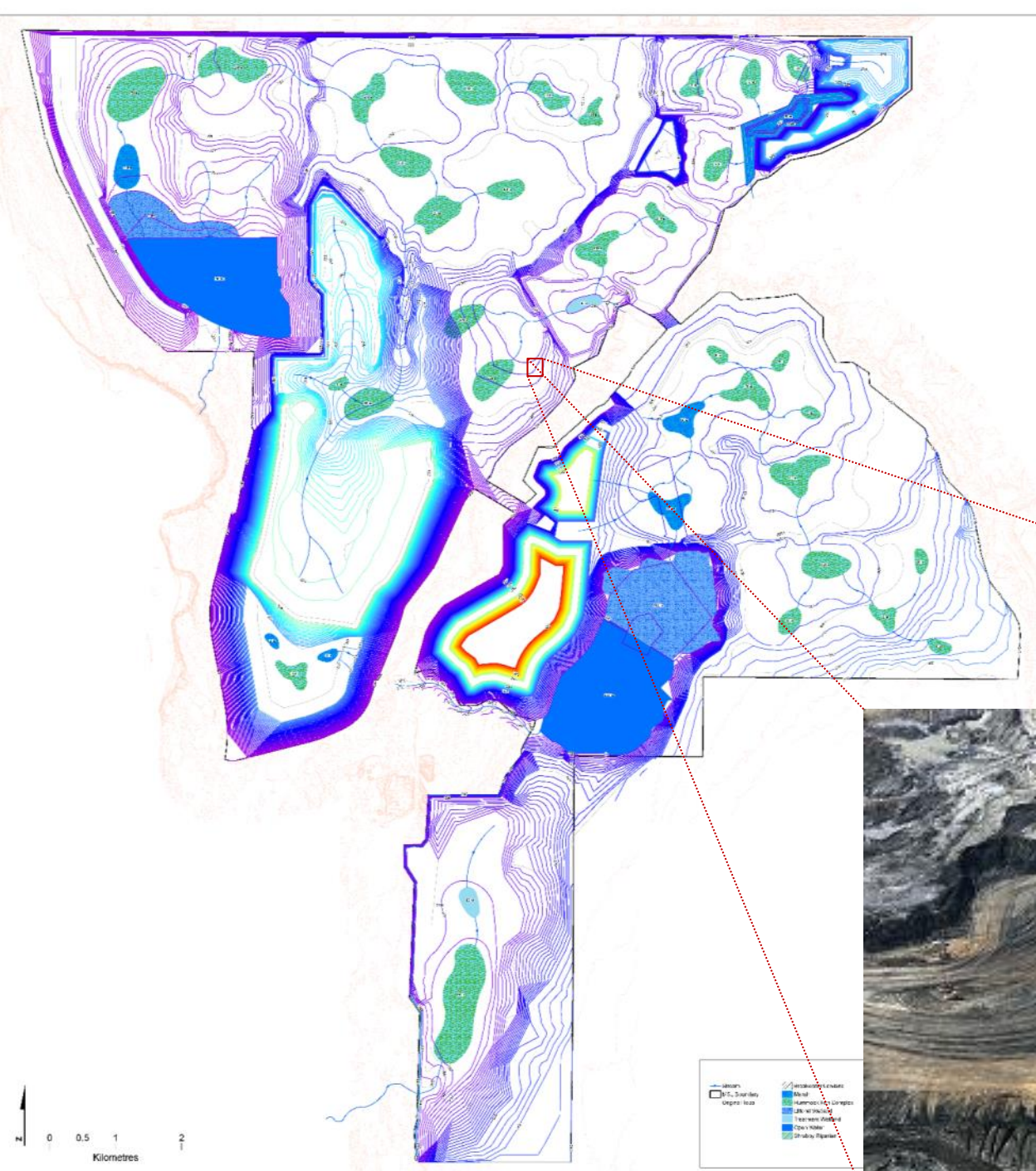


- Salt grass
- Saline irrigation - 6,660 mg/L TDS
- Subsurface drip tubing - only viable method
- 2,400 acres



Mine reclamation

APPROXIMATE SCALE



Acknowledgements

David Austin, PE
Senior Ecologist
Global Technology Lead
Natural Treatment Systems
CH2M

Maia Singer, Ph.D., CED
Senior Scientist
Water Quality Specialist
Stillwater Sciences

Jim Bays
Technology Fellow
Natural Treatment Systems
CH2M

David Tilley, PhD
Associate Professor
Department of Environmental
Science and Technology
University of Maryland