

# Våtmarksväxter blir biogas i Trelleborgs kommun

Matilda Gradin, Hållbar Utveckling,  
Samhällsbyggnadsförvaltningen  
Trelleborgs kommun

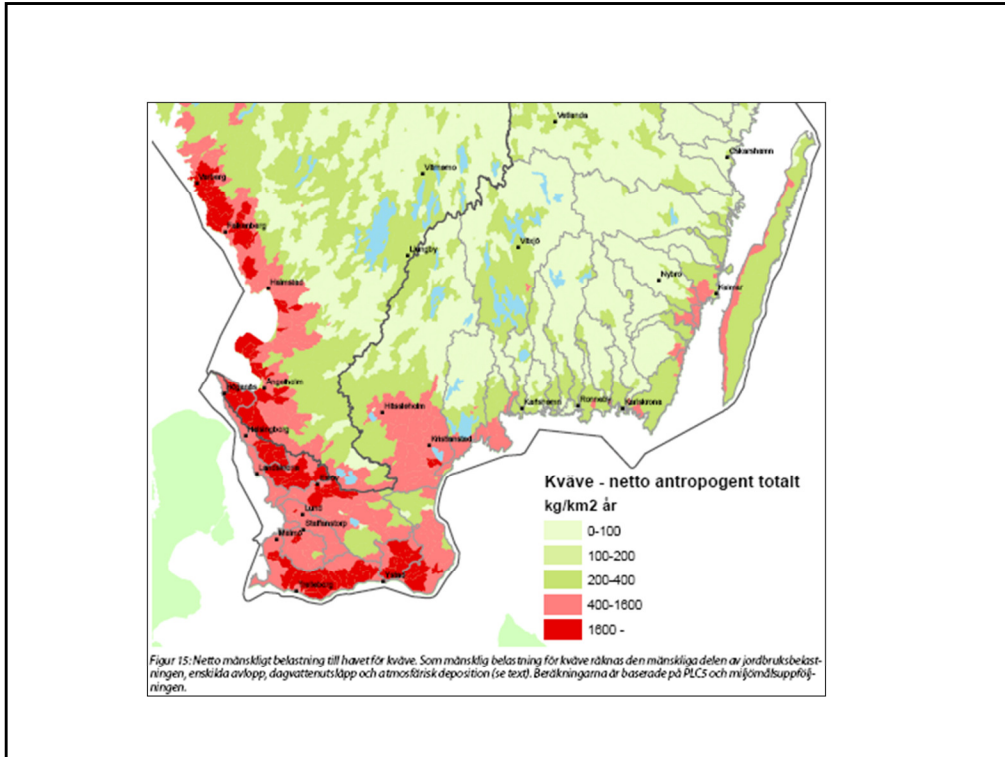
My name is Mathilda Gradin and work for the municipality of Trelleborg (Sweden's southernmost tip) in the department for civil construction an sustainable development. We have for some time been working at sequestering energy from marine and freshwater substrate.

# Trelleborgs Kommun



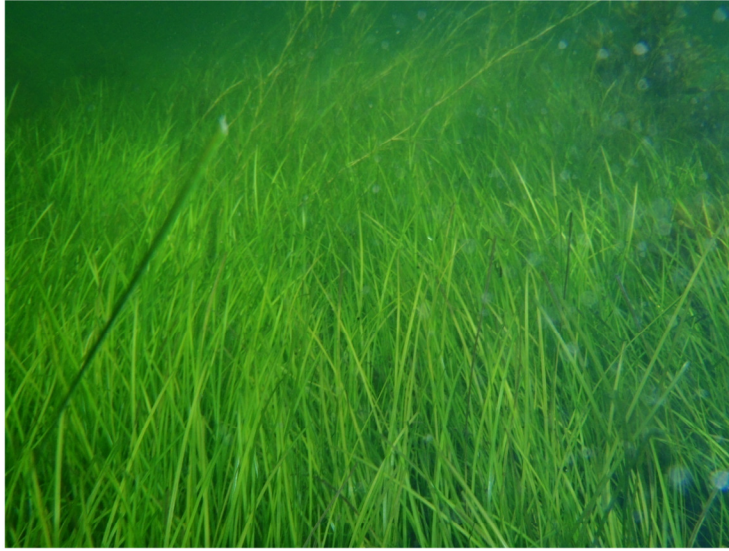
Foto Johnny Carlsson

Some background as to why we work with these questions. Trelleborg is Sweden's southernmost municipality with roughly 40 000 inhabitants. Land area is dominated by agriculture with up till 80-90 croplands. Mainly on 10+ soils (I am sorry I do not know if this is a Swedish term or an international characterisation of soils). These circumstances off course follow with severe impacts on aquatic environments in the area, drained soils, channelized streams and rivers and one of the areas that have been pointed out to impacts the Baltic most (mentioned in a rapport) within the municipality

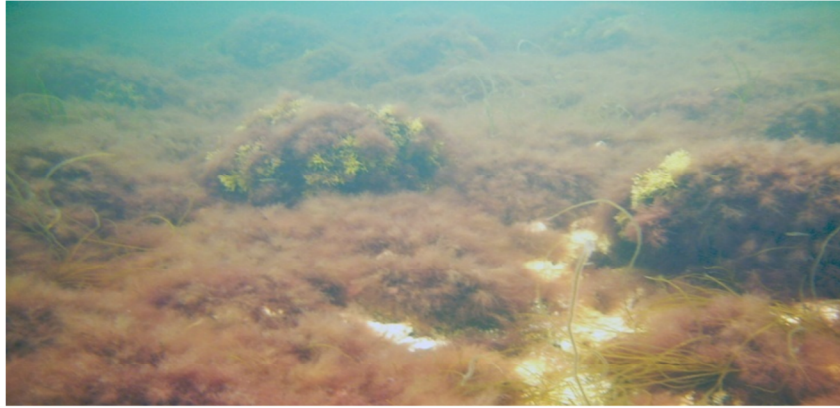


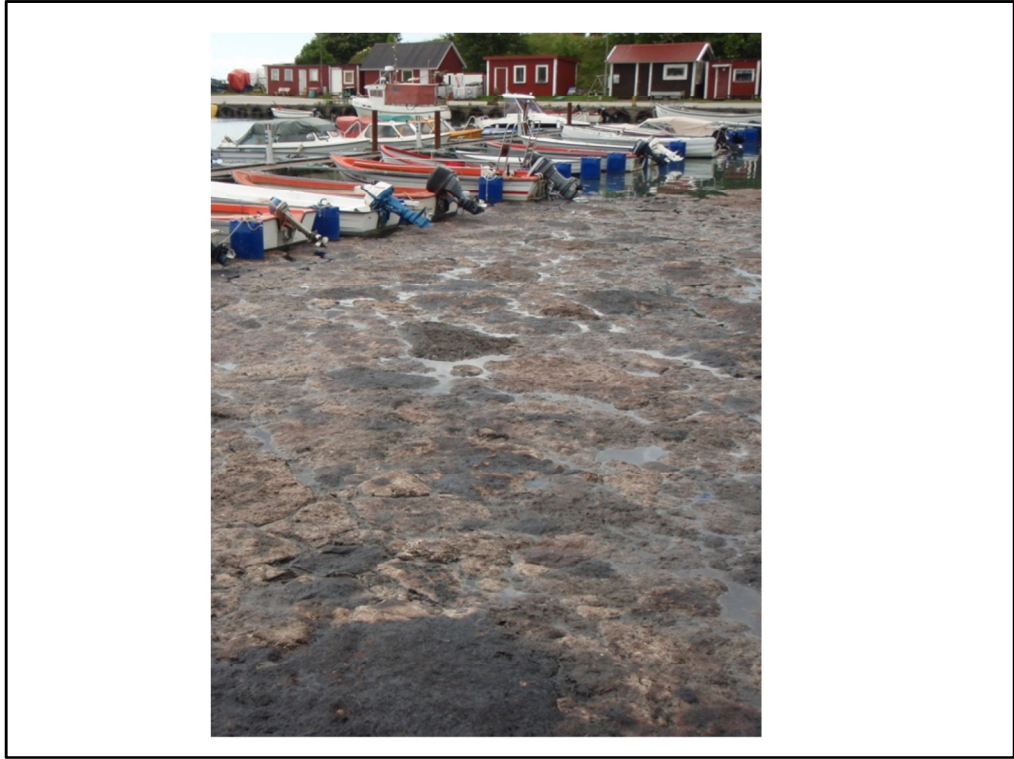
Nitrogen net anthropogenic load in kg/m2/yr

# Trelleborgs Kommun



# Trelleborgs Kommun





# Trelleborgs Kommun

## Våtmarker

Helhetsgrepp kring  
50 våtmarker planerades  
Delar av ån återme...

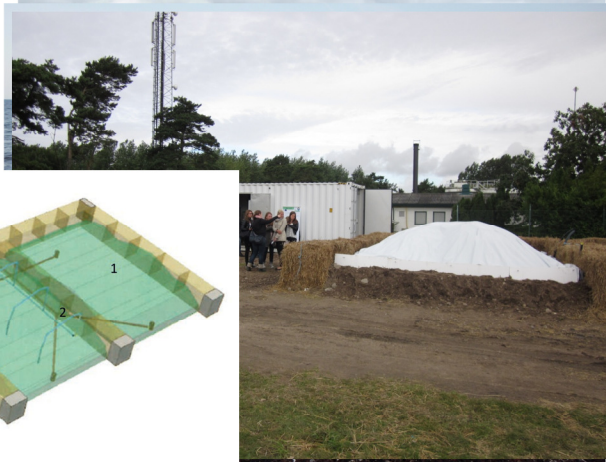
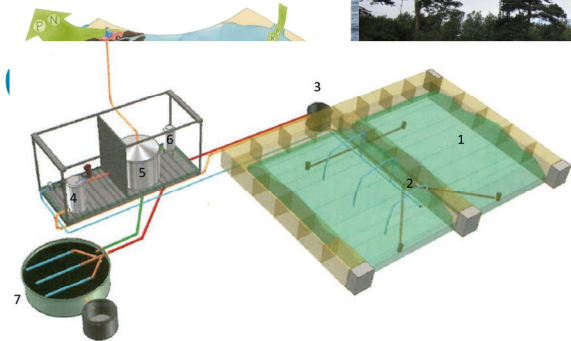


In order to interrupt the outflow of nutrients and reduce the problem with decaying algae along the beaches, Trelleborg has formulated a recycling concept; Fertilisation-restoration-collection-biogas production- reapplication of remains from biogas production. We cooperate with a landowner cooperative, Tullstatorproject, where landowners cooperate in a holistic approach to restore an entire catchment. It is within this catchment that one of our planned production wetlands is planned. 50 wetlands are planned, 25 already constructed and several restoration measures are in place. Algae are collected from the beaches and transported to our pilot biogas plant.

# Trelleborgs Kommun

## Plocka upp alger

Samlar in alger från badstränder  
för att röta i en pilotanläggning



We harvest and decay algae, and in the future even wetland vegetation, in a two-step "dry decay reactor" that has been in operation since September 2011.





Blue concept for a low nutrient/carbon system – regional aqua resource management

Ett resurseffektivt utnyttjande av den överflödiga akvatiska biomassan som idag tas omhand som avfall. Projektet kommer framförallt att demonstrera möjligheterna med att från biomassan producera förnybar energi i form av biogas

LIFE projekt 2012-2015, drygt 30 miljoner SEK

Malmö Stad  
Region Skåne  
Trelleborgs kommun

Here comes Alexander the great's horse. The title of the project bucefalos (read up)  
A resource efficient use of overabundant aquatic biomass that today is treated as "waste".  
The project will mainly demonstrate opportunities to sequester sustainable energy in the form of biogas from biomass



#### Blue concept for a low nutrient/carbon system – regional aqua resource management

Ett resurseffektivt utnyttjande av den överflödiga akvatiska biomassan som idag tas omhand som avfall. Projektet kommer framförallt att demonstrera möjligheterna med att från biomassan producera förnybar energi i form av biogas

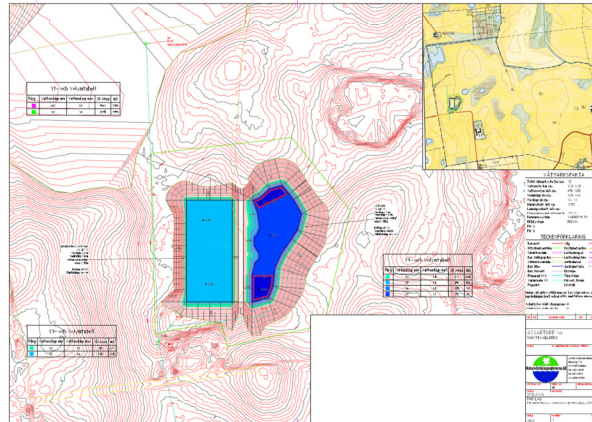
- Anlägga produktionsvåtmarker tillsammans med Tullstorpsåprojektet och på kommunal mark i ett blivande rekreationsområde
- Starta upp ett markägardrivet projekt i ett annat av kommunens vattendrag, Albäcken
- Odlar mikroalger i avloppsvatten
- Biogasproduktion från alger, våtmarksväxter och musslor

Construct production wetlands together with the Tullstorp landowner cooperative and on municipal lands in a future recreational area.

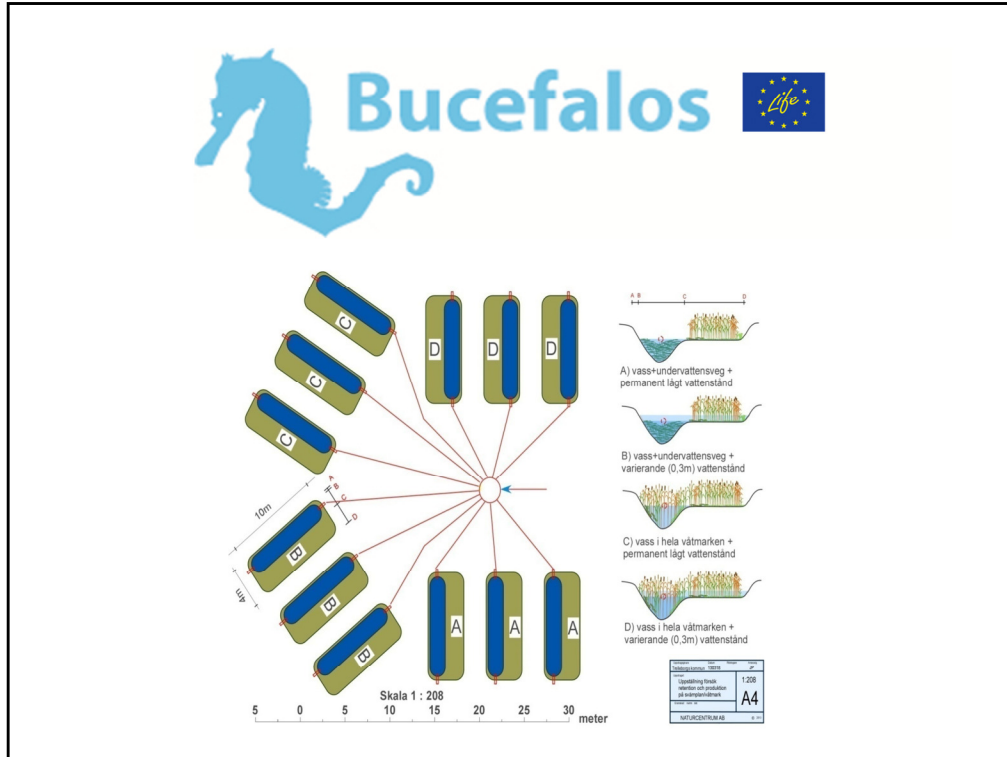
Start up a landowner project in another catchment within the municipality

Grow algae in wastewater

Biogas production from algae, wetland plants and molluscs



Production wetland 1. Here we compare biomass production of natural/constructed wetlands with production wetlands including aspects such as harvest, sediment removal, measurements of nutrients in inlet and outlet. Northern part of the tullstorpåns cooperative.



Production wetland 2: testing nutrient retention and biomass production under varying circumstances.



## Produktionsvåtmarker

### Varför produktionsvåtmarker

- Lågproduktiv åkermark till högproduktiv våtmark.
- Mervärde för markägare vid försäljning /användning av biomassan
- Ökat behov av förnyelsebar energi
- Återvinning av näringsämnen. Effektivare näringsupptag?
- Alla övriga ekosystemtjänster som våtmarken ger på köpet. Vattenrening, näringsupptag, biologisk mångfald, rekreation, ökad vattenhållning i landskapet osv.

Allemansrättslig mark

Sverige 93 %

Skåne 48 %

Söderslätt 2 %

### Why production wetlands?

Move from less productive wetlands to highly productive ones

Added value to landowners by biomass sales

Increased demand of renewable energy

Recycle nutrients. More effective nutrient use?

All other ecosystem services are included in the deal. Cleaner less eutrophicated water, increased biodiversity, recreation, increased water residence time in the landscape and so forth.

Commonly accessible lands

Sweden 93%

Skåne (southernmost province)48%

South slope 2%



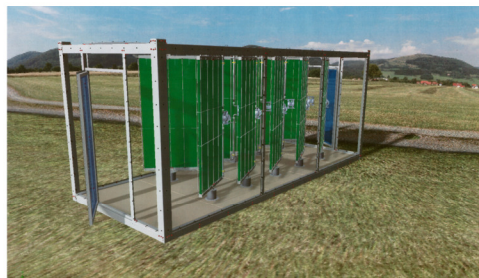
# Bucefalos



## Mikroalger

Odling av alger vid avloppsreningsverk för

- rening av näringsämnen
- biogasproduktion



Microalgae  
Growing algae at the STP for  
Nutrient removal  
Biogas production

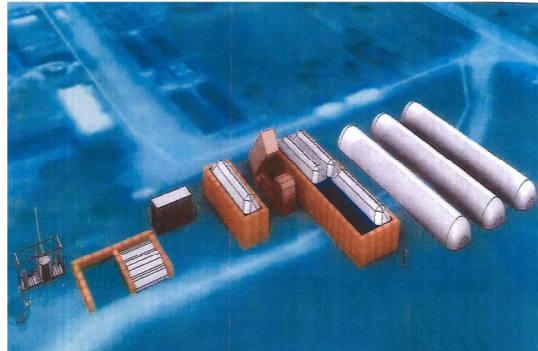


Bucefalos



## Uppskalad biogasanläggning för alger

- 500 m<sup>3</sup> material/år, framförallt alger
- Material väljs bla utifrån Cd-halter
  
- Pilotanläggningen ska testa våtmarksväxter och musslor



Upscale reactor for algae

Harvest of 500 m<sup>3</sup> material per year mostly algae

Material selected based upon amongst other Cadmium concentrations

Pilot plant will be tested with biomass from emergent plants and molluscs.