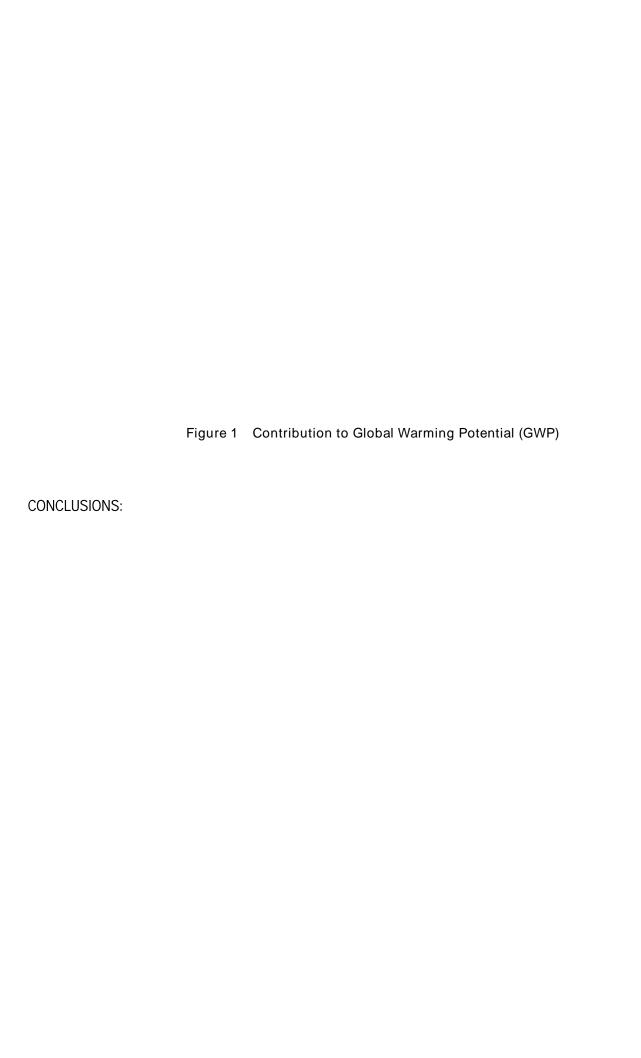
## Accarnsi Honours & Masters Research Grant Report

# NITROUS OXIDE EMISSIONS FROM MARINE WASTEWATER DISPOSAL A LIFE CYCLE ASSESSMENT STUDY

### INTRODUCTION AND RESEARCH SIGNIFICANCE:

Nitrous oxide ( $N_2O$ ) is a significant greenhouse gas (GHG) that is increasingly contributing to atmospheric global warming and stratospheric ozone destruction. Anthropogenic nitrogen production, which started at the beginning of the twentieth century, has led to an acceleration of the



### FURTHER RESEARCH SUGGESTIONS:

Following the completion of the study, there are a number of areas that were identified as requiring further research:

Marine N<sub>2</sub>O emission factors

Energy recovery options from fertiliser use and biogas capture

Broader integration of renewable energy technologies in WWTP (i.e. hydropower, biogas recovery)

Extraction and application of nutrients from municipal wastewater

#### REFERENCES:

- Bange, H. W. (2006). "New Directions: The importance of oceanic nitrous oxide emissions." Atmospheric Environment 40(1): 198-199.
- Foley, J., D. de Haas, K. Hartley, P. Lant. (2010). "Comprehensive life cycle inventories of alternative wastewater treatment systems." Water Research 44(5): 1654-1666.