



Localization of sewage collection stations in Norrtälje archipelago

BATSECO BOAT WORK PACKAGE 2, TASK 2.2

Svensk sammanfattning / Summary in Swedish

BATSECO är ett EU-projekt i vilket kommuner, ideella organisationer och privata företag runt Östersjön vill underlätta för båtlivet genom att installera latrintömningsstationer. I denna rapport redovisas arbetet med att kartlägga båtrörelser i Norrtälje kommun med hjälp av AIS-data och enkäter och förslag ges på lokalisering av nya latrintömningsstationer i Norrtälje. Arbetet har utförts av Maria Johansson och Maria Mustonen på Ecoloop. Norrtälje kommun används som en fallstudie, syftet är att fler kommuner runt Östersjön ska kunna göra liknande kartläggningar för att lokalisera latrintömningspunkter. Resultatet av båtrörelsekartläggningen kan ses på sidan 4. De föreslagna nya latrintömningspunkterna är Långgrund/Själgrund, Fejan (nygammal!) eller Riddersholms gästhamn, ytterskärgård nära Hallskär samt ytterskärgård i södra Norrtälje. Kartor över dessa områden visas på sidorna 11 till 14. Den använda metoden med inspelning av AIS-data var användbar för kartläggning av båtrörelser, men det finns risk att den ger en skev bild eftersom det snarare är större båtar som har AIS-logger. Det var mycket användbart att komplettera AIS-kartläggningen med lokal kännedom från kommunala förvaltningar, båtklubbar och Skärgårdsstiftelsen.

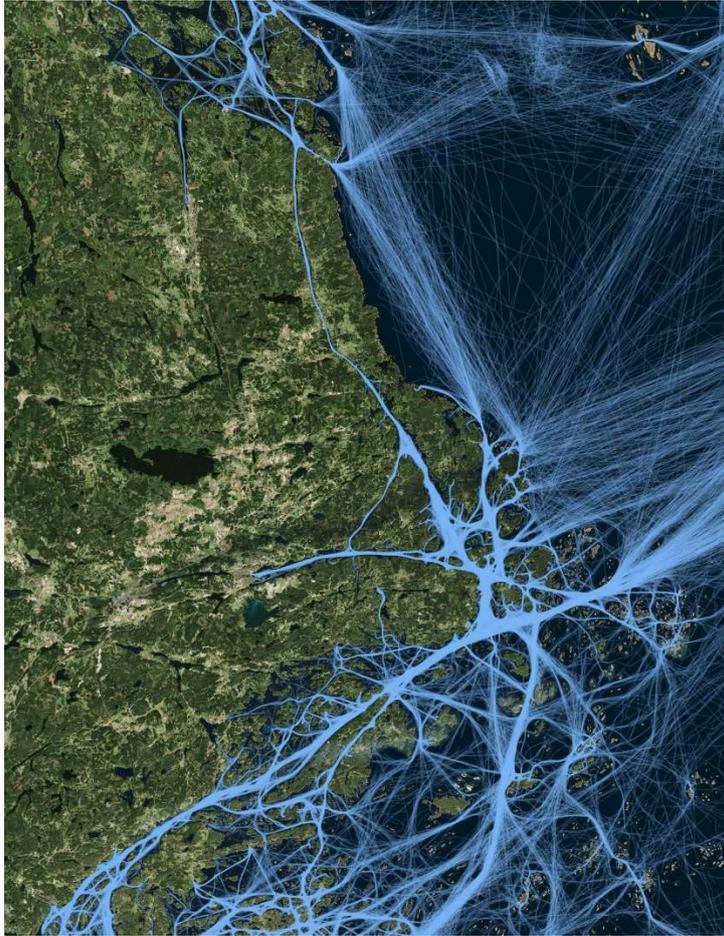
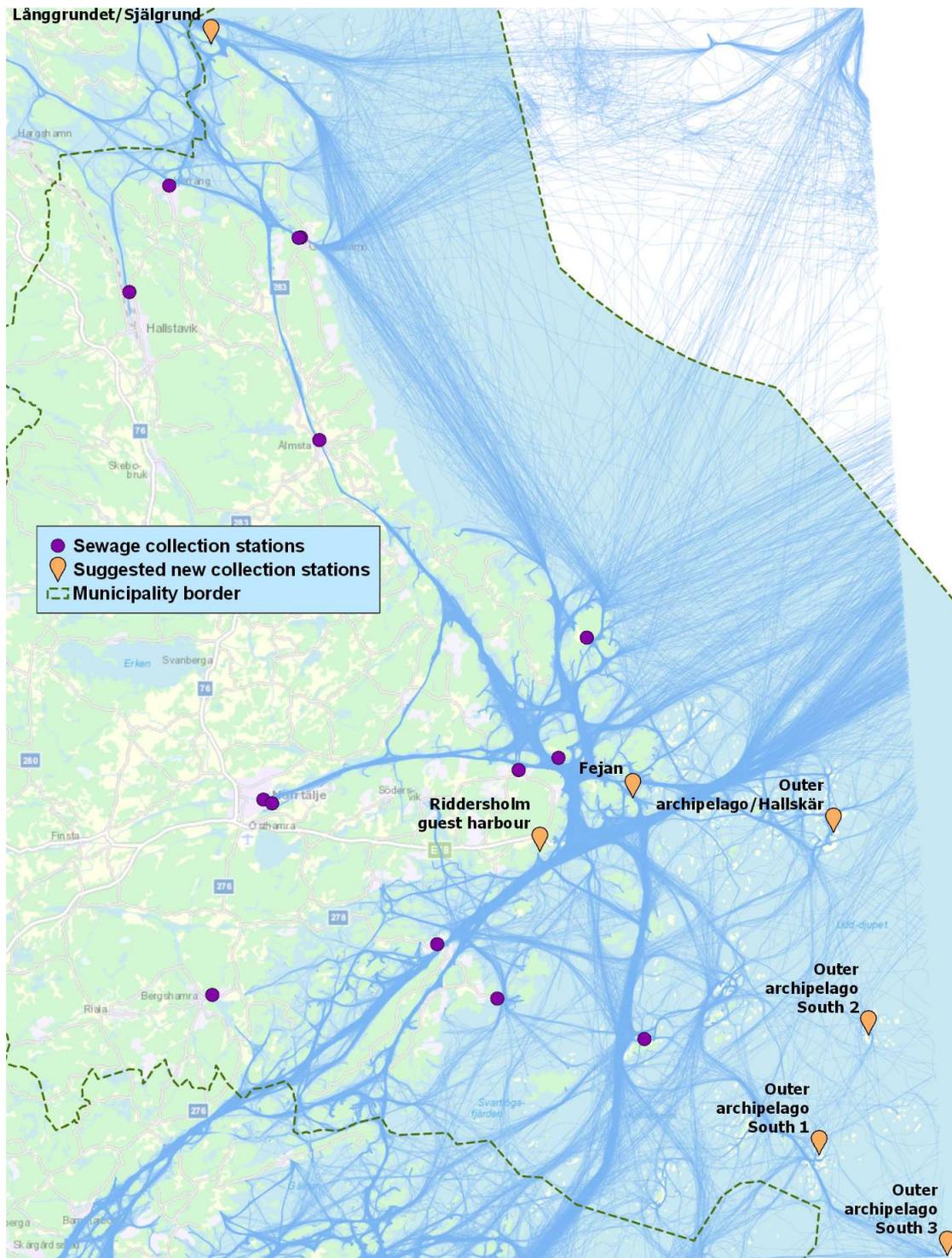


Figure 1: Example of AIS-data, traffic of small boats in Norrtälje archipelago during summer 2018



Map 1: Existing collection points for sewage from small boats (purple dots) and suggestions for localization of new sewage collection points (orange tear shaped markers). Blue lines represent boat movements recorded from AIS-loggers during summer 2018.

Table of Contents

Svensk sammanfattning / Summary in Swedish.....	2
Introduction	6
Aim of this report.....	7
Methods.....	8
Mapping of boat movements.....	8
AIS-data	8
Questionnaires.....	8
Mapping points of interest	9
Public map data	9
Workshop	9
Criteria for localization.....	9
Results	10
Långgrund/Själgrund	11
Fejan and Riddersholms guest harbour.....	12
Outer archipelago/Hallskär.....	13
Outer archipelago/South.....	14
Suggestions for going forward.....	15
Considerations for Norrtälje municipality.....	15
What tourism pattern should a new sewage collection station support?.....	15
Is there a suitable location in the suggested area?.....	15
General suggestions for municipalities doing AIS-data localization studies.....	16
Use AIS-data, but use it with care	16
Supplement AIS-data with local knowledge.....	16

Introduction

Visiting leisure boat harbours in the Baltic Sea area fascinates both national and international visitors, many of whom explore the coastal and archipelago areas using small leisure boats. Boat tourism is an important and popular way to spend a summer holiday in archipelagos and coastal areas, which provide beautiful and peaceful maritime nature experiences. However, staying and living for weeks in a leisure boat requires similar kind of community services to what we usually have at home, but require a somewhat different organisation. Usually it is the small boat harbours that provide and sell most of these services to boaters.

The possibility of emptying toilet waste from leisure boats can be considered a fundamental service for boaters, which, when neglected, has a crucial impact on boaters' comfort during. However, this basic service suffers from problems, such as lack of easily accessible and functional sewage pump-out stations; non-harmonized sewage collection equipment; and lack of easily accessible information regarding location and functionality. It is also important to reduce visitor detours (having to make extra trips to other stations, when the nearest station is full or malfunctioning) by improving information regarding the pump-out station network and its' operability. Moreover, it can be difficult for international visitors to know what kind of waste handling and pump-out services that exist. Both Sweden and Finland have an extensive archipelago with an active leisure boat life where boaters commonly cross between the countries. Although toilet waste collection systems have been in place for several years, there is need to address both technical and managerial challenges. In Estonia, where the boating culture is very young, the coastline is open and waters are shallow, the coverage of sewage collection services is low. Thus, it is important to upgrade the service level in Estonia. Cross-border collaboration and exchange of experiences has the potential to facilitate mutual support, good examples and a more systematic approach to the management of toilet waste from leisure boats across the Central Baltic region.

The BATSECO-BOAT (Best Available Technologies of Sewage Collecting for Boat tourism) project is a collaborative project between three countries in the central Baltic region: Finland, Sweden and Estonia. The aim is to 1) increase tourism across the Central Baltic Region by investing in best available technologies for sewage collection and management and 2) create improved service facilities for leisure boats visiting small harbours in the Baltic Region.

By installing new pump-out stations, the BATSECO-BOAT project also contributes to the objectives of EUSBSR in keeping the sea cleaner by facilitating collection of nutrients from toilet waste from leisure boats and thereby reducing a source of algal growth and eutrophication. The project supports the tourism industry with a cross-border approach that benefits both entrepreneurs and public authorities, and the Baltic Sea environment as whole.

The main results of the BATSECO-BOAT project include an upgrade of the sewage collection services in 18 leisure boat harbours in Estonia, in Finland and in Sweden. The upgrade is realised by

investments into the best available technology of sewage collection, including both new and renovated pump-out stations. This upgrading ensures good level of unified sewage collection services in the participating leisure boat harbours across the Central Baltic region for the next 15-20 years, way beyond the duration of BATSECO-BOAT project.

The BATSECO-BOAT-project continues for three years (2018-2020) and is coordinated by the Brahea Centre at the University of Turku. Other Finnish project partners are Keep Archipelago Tidy, the Swedish partners Ecoloop AB, UCV/Campus Roslagen and Norrtälje municipality and the Estonian partners are Hoia Eesti Merd (Keep the Estonian Sea Tidy) and Viimsi municipality. The BATSECO-BOAT project is funded by EU's Interreg Central Baltic program, the total budget of the project is 1,48 million euro.

Aim of this report

In project work package 2.2 the task was to map boat movements and suggest suitable locations to install sewage collection points for small boats, in a case study using Norrtälje municipality as a test area. If found useful, similar mappings could be used in other municipalities on the Baltic sea coast when planning for sewage collection points servicing small boats.

The mapping of boat movements in Norrtälje, suggested collection points and the methods and reasoning behind the suggestions are presented in this short report. The last section contains some suggestions to keep in mind when doing similar mappings in other municipalities. The analysis has been carried out by Maria Johansson and Maria Mustonen, Ecoloop AB.

Methods

Mapping of boat movements

Two types of information were used to map movements of small boats. The types of boats of interest were privately owned boats for tourism that had onboard latrines. These could be either sailing boats or motor boats of various sizes. Some of these boats use AIS transceivers to show their position and view positions of other boats. Recorded data from these transceivers was one type of data used. This data was supplemented by questionnaire data.

AIS-data

AIS stands for Automatic Identification System, which is a system used by commercial as well as private ships to avoid collisions. An AIS-transceiver can both send and receive signals. It broadcasts a signal containing information of the identification of the boat, its position and heading, and it can receive information about ships in the same area. AIS-transceivers can be either Class A, used mainly by commercial and larger ships, and Class B used by smaller boats and privately owned boats. Class A contains much more information than Class [BA](#). It is estimated that only a few percent of owners of smaller, private boats use AIS.

The AIS-signals are received by, among others, the Swedish Maritime Administration, which sells access to AIS-data as a live stream. This kind of live stream is used for example by organizations to show boat movements on online maps (see for example www.marinetraffic.com).

In the BATSECO project a live stream from the Swedish Maritime Administration was recorded for the area of Norrtälje from May 28th to August 31st, 2018. The data was filtered to record only Class B transponders. The recorded data was translated into map files (ArcGIS shape files) to be used for map making. A representation of the full dataset is shown on page 3, as well as in Map 1 on page 4.

Questionnaires

As many leisure boats, particularly smaller ones, lack an AIS transceiver, the AIS data was complemented by an internet questionnaire aimed at boat owners and boat clubs and face-to-face interviews with boat owners on marinas. The internet survey was distributed in English, Swedish and Finnish on the project web page, on the web pages of the project partners and on LinkedIn. Unfortunately, only a few replies were obtained on the internet survey: 2 boat clubs and 35 boat owners, whereof only 12 have a home harbour in Sweden, replied to the Swedish survey. The face-to-face interviews were made with 17 boat-owners in three different sites (one marina, one boat club and one guest harbour) in June 2018.

The data from the survey and the face-to-face interviews were suitable for a qualitative analysis regarding the usability of the different types of sewage collecting stations and general preferences

for the optimal locations of the stations, but it was not suitable to indicate any particular locations for new stations.

Regarding the optimal location for a sewage collection station, the indication is twofold. Firstly, the several respondents prefer sewage collection stations at the same locations as other service for boat tourism, such as guest harbours, marine fuel stations and grocery stores. A common opinion stated during the interviews was that every guest harbour should have a sewage collection station. Secondly, the need of sewage collection stations in the outer archipelago was indicated. Stations in the outer archipelago would make it possible for longer stays out in the uninhabited areas.

Mapping points of interest

To analyse which points would be most suitable for installation of sewage collection points supplementary data to the boat movements was collected.

Public map data

Public map information that shows facilities in the Norrtälje archipelago which boat tourists may visit was collected with the help of Norrtälje municipality and from public sites, together well as information that might help decide the suitability of a certain location, such as land ownership. The following information was collected:

- Existing sewage collection points
- Land owned by Norrtälje municipality
- Borders for national parks and nature reserves
- Locations of small boat harbours
 - Harbours accepting guests
 - Natural harbours
 - Harbours with waste collection stations
- Public boat transportation hubs

Workshop

The recorded AIS-data was presented at a project workshop with participants from local boat clubs, Norrtälje municipalities waste collection organization, an organization managing hostels and tourism facilities in the archipelago in the Stockholm region, and several project partners. Reactions and suggestions from the audience was recorded and used when suggesting criteria for localization of sewage collection points.

Criteria for localization

Criteria for localization of sewage collection points were discussed at the project workshop as well as internally by the analysts. Not all criteria must be fulfilled for a suggested localization.

The following overall criteria were used:

- Large amount of boat traffic to the area or to nearby areas
- No sewage collection station nearby
- A wish by the municipality or local boat owners to draw tourism to an area
- Facilitating international boat tourism in the Baltic Sea

Results

The results of the AIS-mapping of boat movements are presented in Map 1. The map also shows existing sewage collection points and the suggested new sewage collection points. Four areas are suggested:

- Långgrund/Själgrund
- Fejan or Riddersholm guest harbour
- Hallskär/outer archipelago
- Outer archipelago south

These are shown in the following maps with explanatory texts.

The suggested areas have different characteristics, as explained in the texts. Which localization(s) Norrtälje municipality should choose depends on what strategy for leisure boat tourism the municipality to support; is it important to draw boat tourism to areas which are not yet as intensely used as the most popular areas, or is it more important to add stations in the most densely used areas? The local conditions will also be important, for example ownership of land, closeness to other services and accessibility for the sewage collection vehicles. In the following texts land owned by the municipality has been marked, as well as other services such as harbours for boat owners. Physical conditions in the area (wind, waves) and accessibility for sewage collection vehicles has not been studied.

Långgrund/Själgrund



Map 2: Långgrund/Själgrund. Green lines represent the AIS-data recorded during summer 2018, each line is a boat movement.

This is the northernmost suggestion. In the workshop a wish by local boat owners to draw more boat tourism northwards was expressed. There are few existing stations on the way north along the coast from central Norrtälje, so a station in this area would supplement the existing stations. The exact location was suggested by a questionnaire respondent who described it as being protected from wind and waves. This location is also close to an area used for summer camps by the Stockholm district of the Guides and Scouts of Sweden (Vässarö) which might draw some tourism to the area. The area also contains several nature reserves.

Fejan and Riddersholms guest harbour



Map 3: Fejan and Riddersholms guest harbour. The brown area is land owned by Norrtälje municipality. The red markers show two alternative localizations in the area, where Fejan is in the upper right corner and Riddersholms guest harbour is on the left side in the map. Green lines represent boat movements.

This is an area with a lot of boat traffic, both boats travelling within Norrtälje archipelago and such boats which intend to cross over to Åland and Finland or coming from that direction. It would therefore be important to have a sewage collection point in this area, both for local and international tourists. This area has previously had a station, at Fejan, but it has been out of commission for a while. Fejan is the suggested localization in the upper right corner of the map. The station is not located on land owned by Norrtälje municipality which has made it difficult for the municipality to influence the management of the station. The other location, Riddersholms guest harbour, is a suggestion from a sewerage-advisor (VA-rådgivare) in Norrtälje municipality. The guest harbour is located in a nature reserve which receives many visitors. The location would be accessible from land with a future possibility of connection to the sewerage system of Norrtälje. The location would also make it possible to install land-based toilets for visitors to the nature reserve. The guest harbour rents land from Skärgårdsstiftelsen. Initial contacts with the guest harbour have shown that they could be interested in supporting a sewage collection solution.

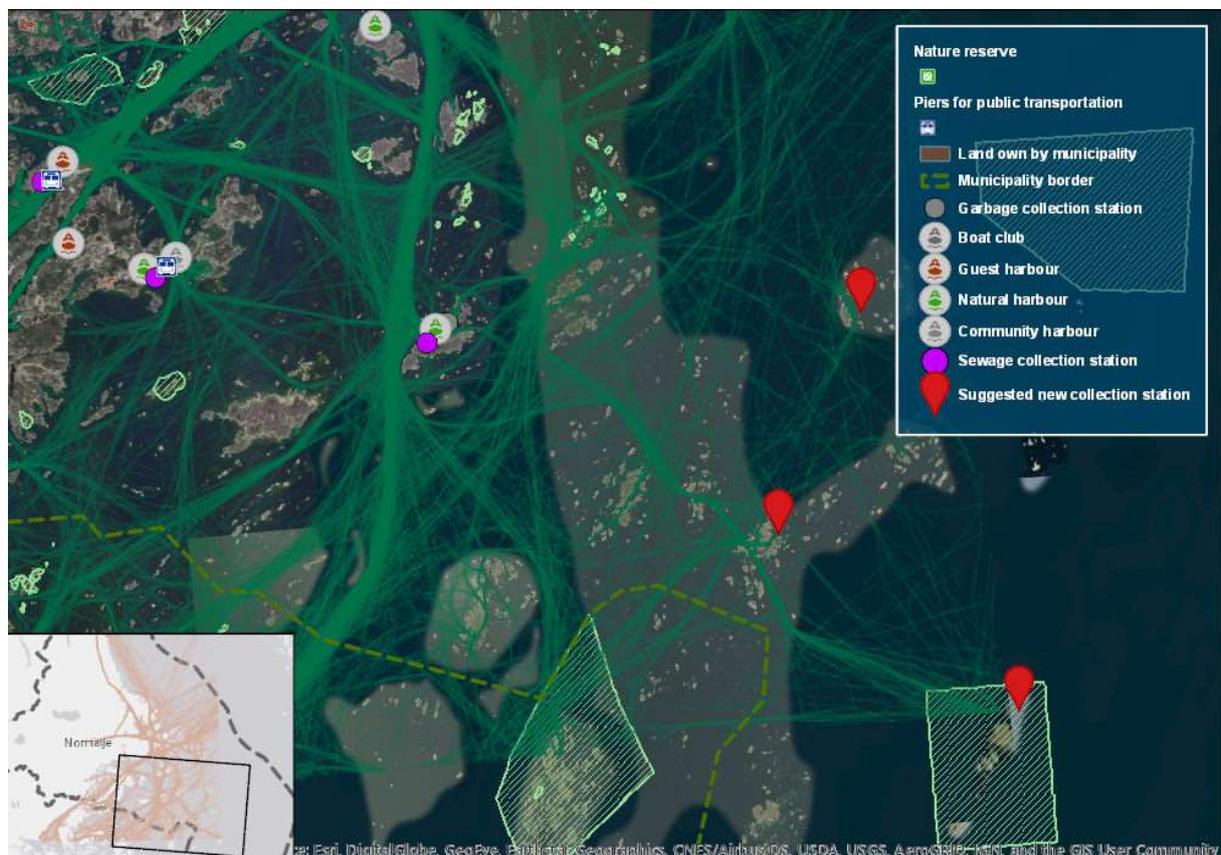
Outer archipelago/Hallskär



Map 4: Outer archipelago/Hallskär. Green lines represent boat movements.

The outer archipelago generally has less density of boat movements than the inner archipelago. In the workshop a wish to stay in the outer archipelago for longer periods of time was expressed by boat owners and it was suggested that the municipality facilitates this by installing sewage collection also in the outer archipelago. The suggested area is in the outer archipelago but still has a relatively high density of boat traffic which might make it suitable for a collection point. The next closest collection is relatively far away. This area also has land owned by Norrtälje municipality.

Outer archipelago/South



Map 5: Outer archipelago south. The red markers show three alternative localizations of sewage collection points in the area. Green lines represent boat movements. The southernmost suggestion is at "Svenska högarna", the middle point is Alskär and the northernmost point is "Storskäret" near the water area Fladen.

This area is in the outer most regions of Norrtälje archipelago and in the southernmost tip of the municipality. Even if the traffic is denser further in, this area also sees a lot of traffic traveling up from and down to Stockholm archipelago and going forward or coming from Åland. In the map three alternate localizations is shown, the suggestion is that one of these be chosen. All three points already have traffic going to and from them. Apart from serving boat traffic passing by, a collection point in this area might also help boat owners who want to stay in the outer archipelago for longer periods of time.

Suggestions for going forward

Considerations for Norrtälje municipality

What tourism pattern should a new sewage collection station support?

Sewage collection stations in each of the four different areas suggested for consideration would support leisure boat tourists in different ways:

the northernmost location (Själgrund), and the outer archipelago/Hallskär locations would support tourists wanting to stay longer in the outer archipelago or wanting to travel northwards, thus drawing boat traffic to areas which are used less than they could be today. Both locations have been suggested based on input from leisure boat owners.

The outer archipelago/south area is a combination of support for international leisure boat tourism serving boat owners who travel across the Baltic between Sweden and Finland, and for boat owners wanting to stay for longer periods in the outer archipelago of Norrtälje.

The location Fejan/Riddersholm is in an area with dense boat traffic and would supplement already existing stations. These locations were also based on suggestions from boat clubs and boat owners.

Is there a suitable location in the suggested area?

This study has pointed out general areas where a sewage station would serve different groups of boat tourists, based on existing leisure boat traffic and on expressed wishes from boat owners. To be able to place a station in an area an exact location must be chosen. In the case of Själgrund and Riddersholm/Fejan exact locations have been suggested by boat clubs/boat owners/owners of facilities in the area. However, for these locations as well as possible locations in the other two areas, their suitability must be considered. Some criteria that can be used in these considerations are listed below.

Factors influencing ease of use for boat owners:

- Co-localization with other services
- Wind and waves in the area
- Water depth
- Localization close to popular travel routes

Factors influencing ease of maintenance:

- Accessibility with sewage collection boat or via land
- Wind and waves (for sewage collection by boat)
- Distance to base of sewage collection service

Factors influencing the installation of new stations:

- Boundaries of existing agreements for sewage collection
- Land ownership/possibility for agreements with land owners

General suggestions for municipalities doing AIS-data localization studies

Use AIS-data, but use it with care

The AIS data gave a good overview of boat traffic, but since only a few per cent of boat owners use AIS transceivers the selection of boats is biased, probably towards larger and more expensive boats. These boats are more likely to make longer trips such as crossing the Baltic. The local tourism might therefore be denser than what can be seen in the maps and have different movement patterns.

Supplement AIS-data with local knowledge

In our project it was difficult to get respondents for the questionnaires. The response rate might depend on local connection to boat tourism in the area. The project workshop however gave a lot of useful and interesting input to the analysis for localizations. It was important that both municipal organizations, local boat owners and organizations owning hostels were represented, their views supplemented each other.