

Disposal of plastic end-of-life-boats (ELB)

A Nordic project supported by Nordic council of ministers



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Background

- Almost half of the pleasure boats in Europe are found in the Nordic countries.
- Plastic boats have a long life expectancy
- No national system for ELB



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Partners:



Finland - Keep the Archipelago Tidy
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Aim of the project

- Develop a report describing the problem and challenges
 - ✓ Amount of boats and existing disposal
 - ✓ Possibilities for reuse and recycling of materials
 - ✓ Content of hazardous component
 - ✓ Illegal dumping and marine littering
- Organize a workshop on ELB
- Proposal for possible next step at Nordic level



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Boat statistics



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Total number of boats

Country	No of boats
Finland	750 000
Sweden	943 000
Norway	752 000
Denmark	300 000



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Number of boats > 40 years

Country	No of boats
Finland	?
Sweden	> 100 000
Norway	40 000
Denmark	20 000



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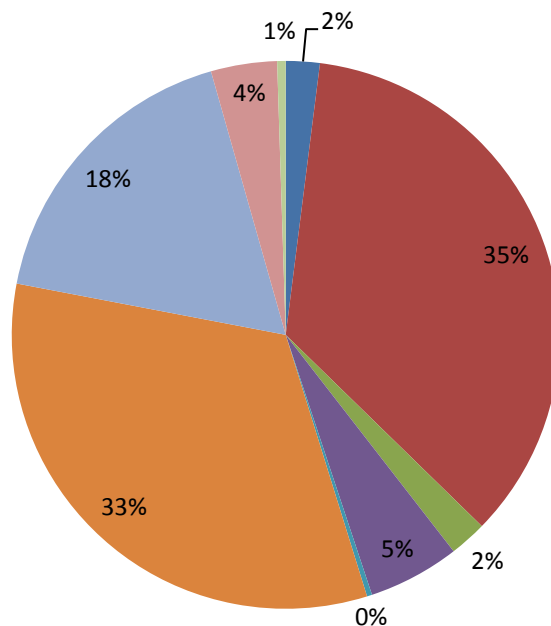
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- Sailboat
- Light sail
- Jet-ski
- Boat with an outboard-motor, over 20hp
- Motor sailor
- Rowing boat, no motor
- Canoe
- Boat with an outboard-motor, max 20 hp
- Sterndrive

Finland



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Types and sizes of pleasure boats

Sweden

Boat category	0-5 m	6-10 m	11-15 m	16-20 m	>20 m	Do not know
Small boat	79.5	7.5	0.1	0	0.1	12.8
Daycruiser	57.2	29.8	1.5	1.0	0.1	10.3
Motor boats for over night	34.2	62.1	1.5	0.4	0.1	1.7
Sailing boats for overnight	2.2	72.7	23.9	0	0,2	1.0
Total (in percent)	58.9	28.7	2.5	0.4	0.1	9.4

Source: Båtlivsundersökningen 2010, Transportstyrelsen



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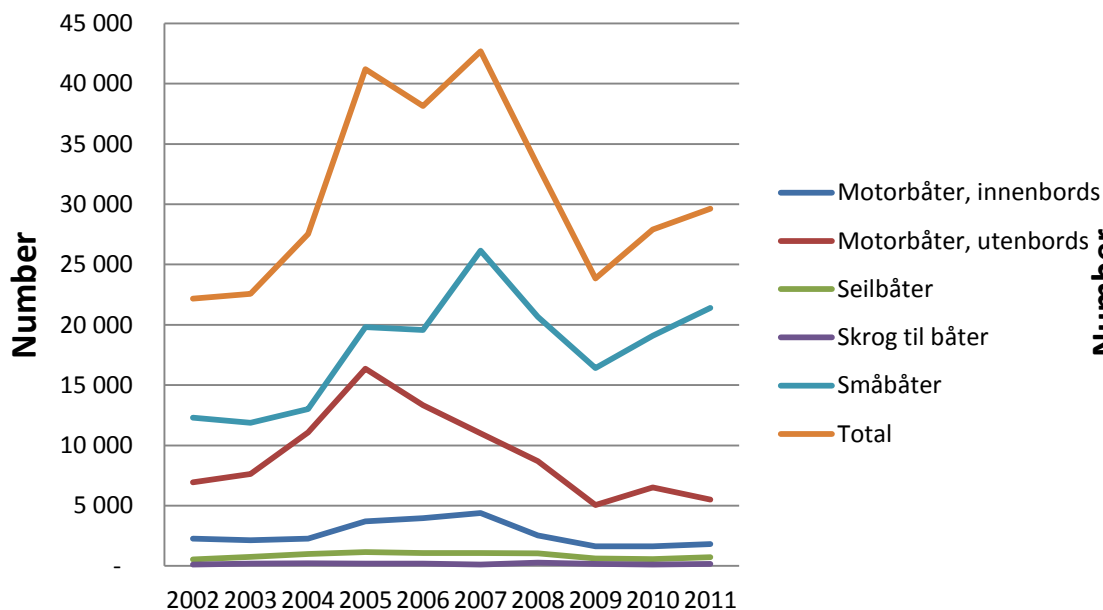
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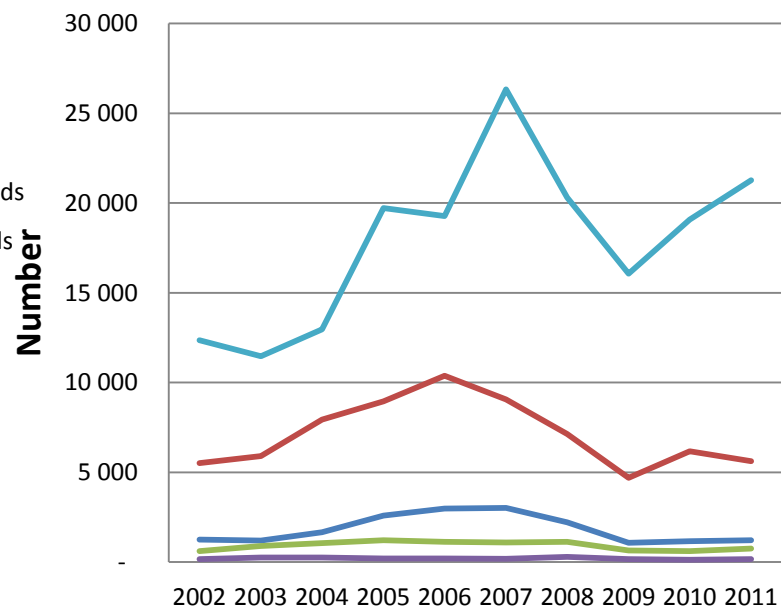
Types and sizes of pleasure boats

Norway

Total No. of sold leisure boats



No of imported leisure boats



Results of boat statistics

- Difficult to find data presented in the same way.
- For Denmark no compiled data was found

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60 – 70 % are smaller boats

Reuse and recycling of boats?



Few operators are scrapping boats

Country	System
Finland	Kuusakoski Ltd.
Sweden	No system for collection and depollutio One private initiativ - Båtskroten in Stockholm
Norway	No system for collection and depollution
Denmark	No system for collection and depollution



Parts that may be reused



Winches



Drev



Outbord
motors



VHF

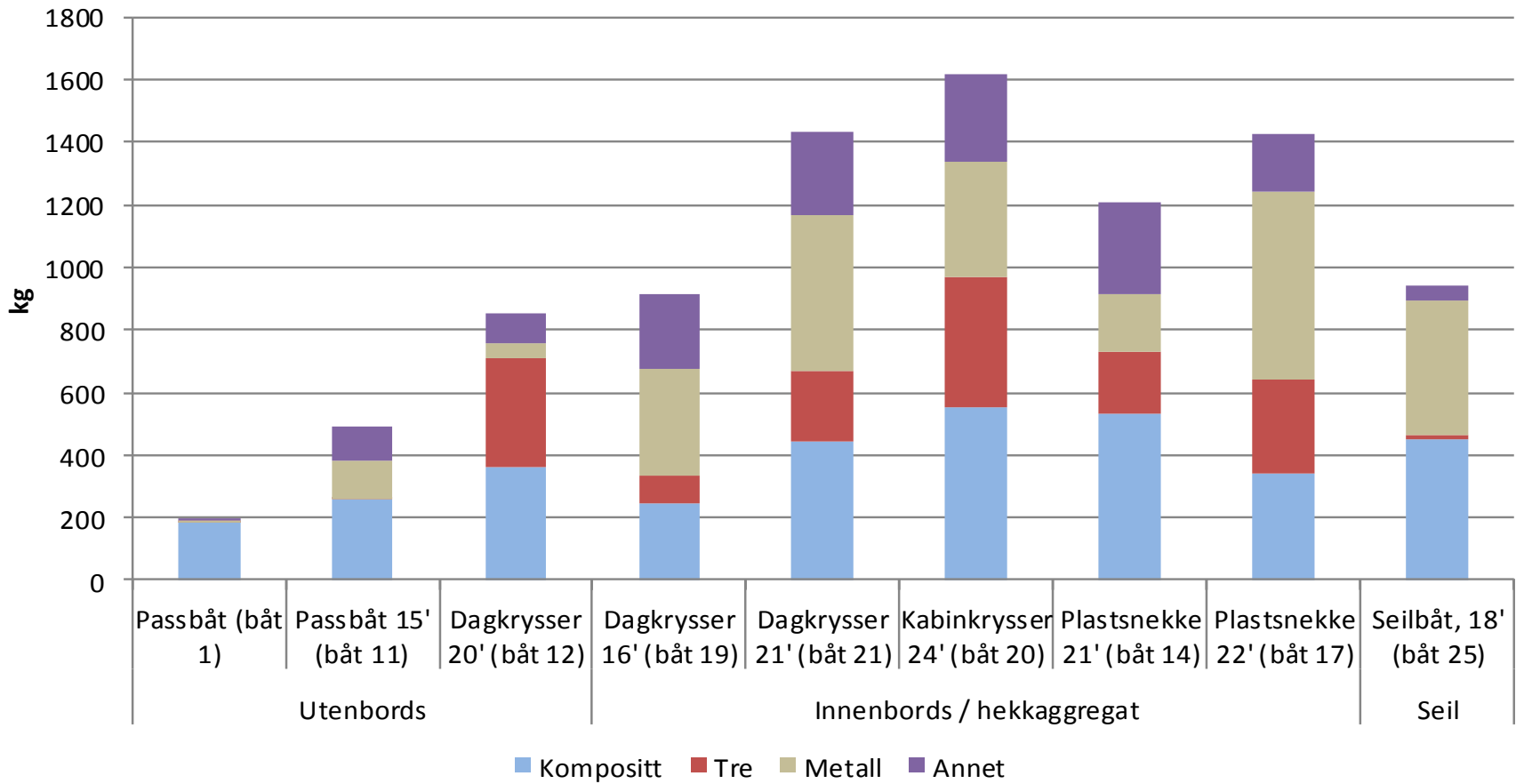


Compass



Tanks

Materialsammensetning, komposittbåter



Hazardous waste from boats?



Boat left outside recycling centre



Toxic chemicals in pleasure boats

- 350 Chemicals in a motor boat
- Boat hull – composite plastic, wood metals
- Anti-fouling paints
- PCBs
- PAHs – from motors
- BFRs- flame retardents (textiles, electronics)

Toxic chemicals in pleasure boats

Boat hull – Anti-fouling paints



Toxic chemicals in anti-fouling paints

Tin-organic
compounds

TBT, DBT, MBT, TFT

Lead

Zinc

Copper

PCB:s

Poly chlorinated
bi-phenyls

Several other
organic
compounds

Mercury

TBT (tri-butyl-tin) is most toxic

- TBT was used in 60-, 70- and 80-ties
- Forbidden 1989 because of its endocrine effects

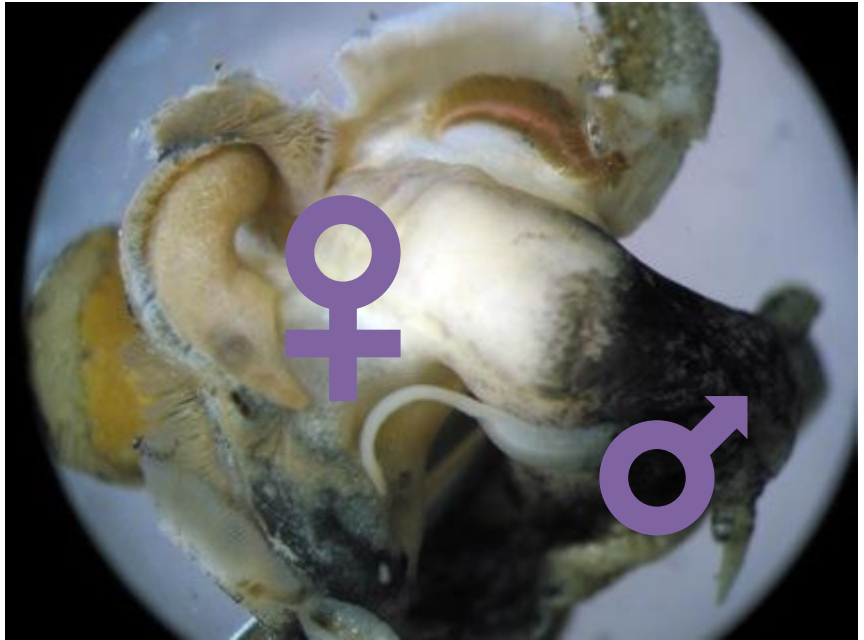


Foto: M. Magnusson

TBT has potential to affect humans

- Immune system
- Hormonal system
- Nerv system
- Skin
- Heart
- Fertility



Toxic chemicals in pleasure boats

- Boat hull – Anti-fouling paints (AF-paints)
- PCBs – from oils and “fogmassa”

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Chemicals in boats

Tin-organic compounds

TBT, DBT, MBT, TFT

Cadmium

Lead

PAH:s

Poly cyclic aromatic hydro carbons

Copper

PCB:s

Poly chlorinated bi-phenyls

Zinc

Mercury

BFRs

Flame retardent

Identification of TBT and metals on boat hulls

- Develop a module to quantify metals in paints, unit: $\mu\text{g}/\text{cm}^2$
- Quantify Sn (TBT), Cu, Pb and Zn on boat hulls.



All hazardous substances should be removed and disposed of in an environmental and safe way



Dumping of boats?



Dumping of boats?

- No estimates have been found.
- A few abandoned boats are found at boat clubs.
- Abandoned boats are rarely found in the nature.



Abandoned boats?



Registration of boats

Country	Registration for:
Finland	Boats > 5.5 m or a motor > 15 kW
Sweden	No mandatory system.
Norway	No mandatory system, but registration is needed for insurance.
Denmark	No mandatory system.

