Small craft as a vector of exotic species

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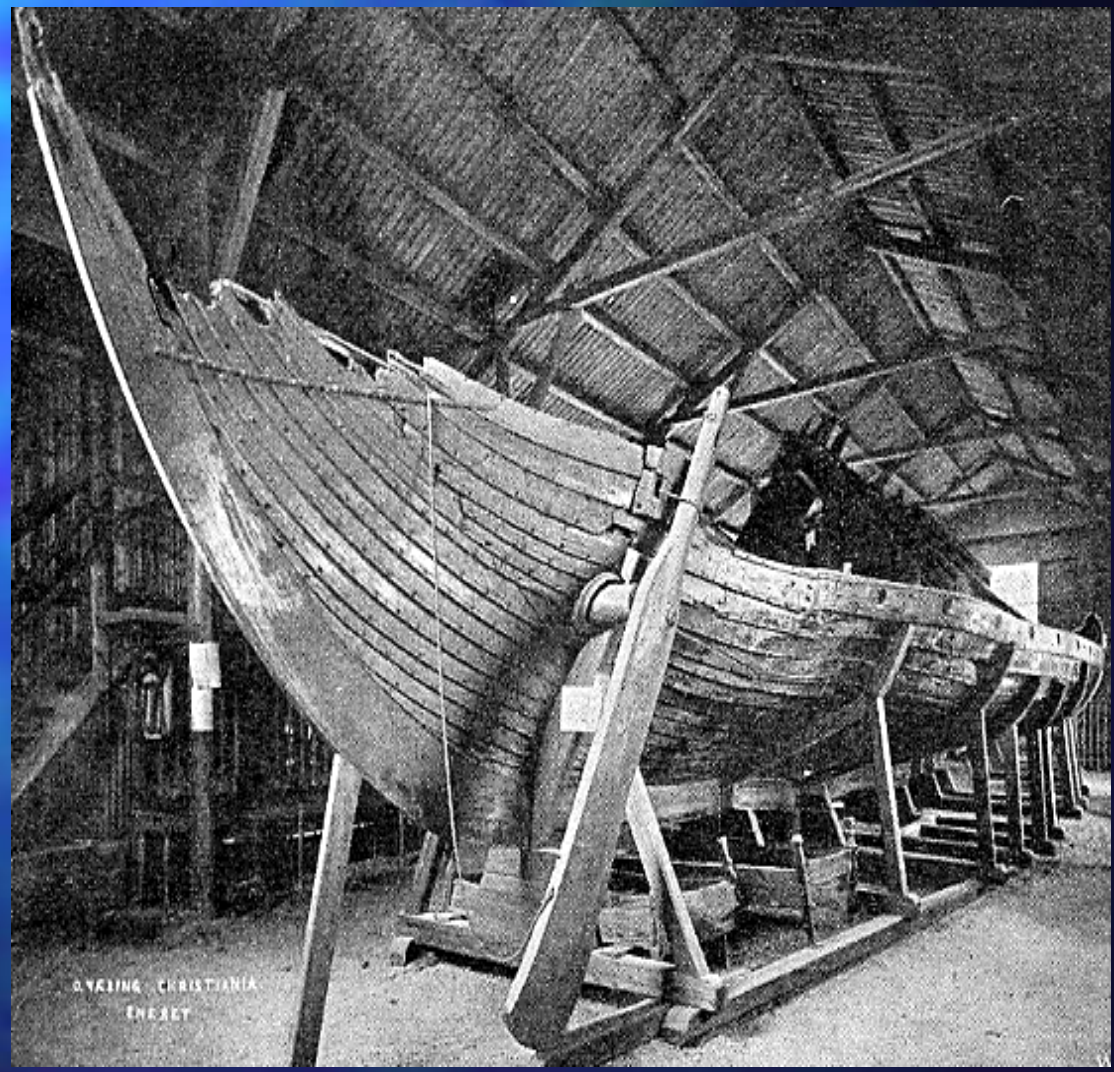
Ireland, Italy & New Zealand

European Union Framework 6 Programme - ALARM

Human mediated vectors

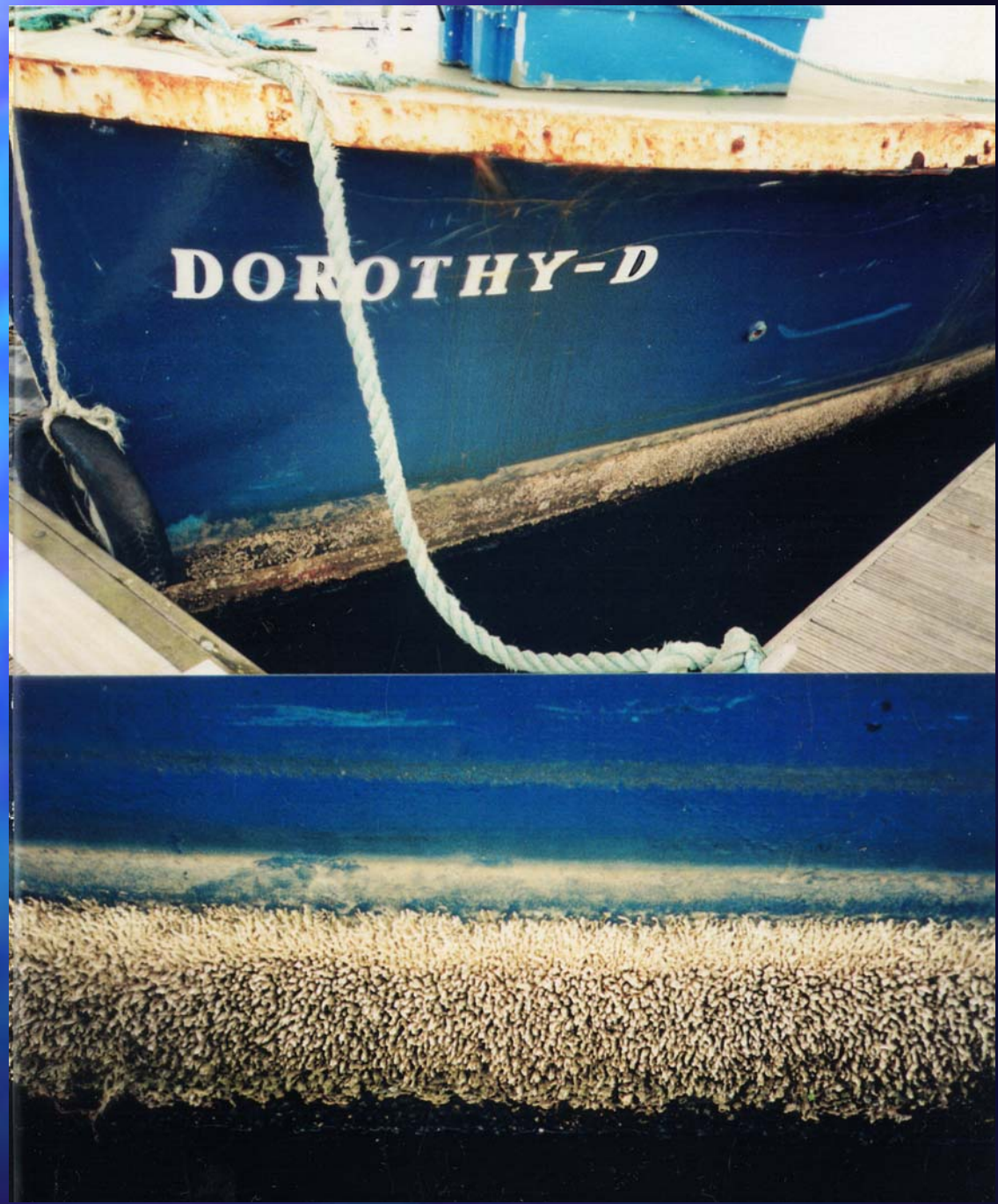
- Not many biologists some hundreds of years ago when people started to travel widely

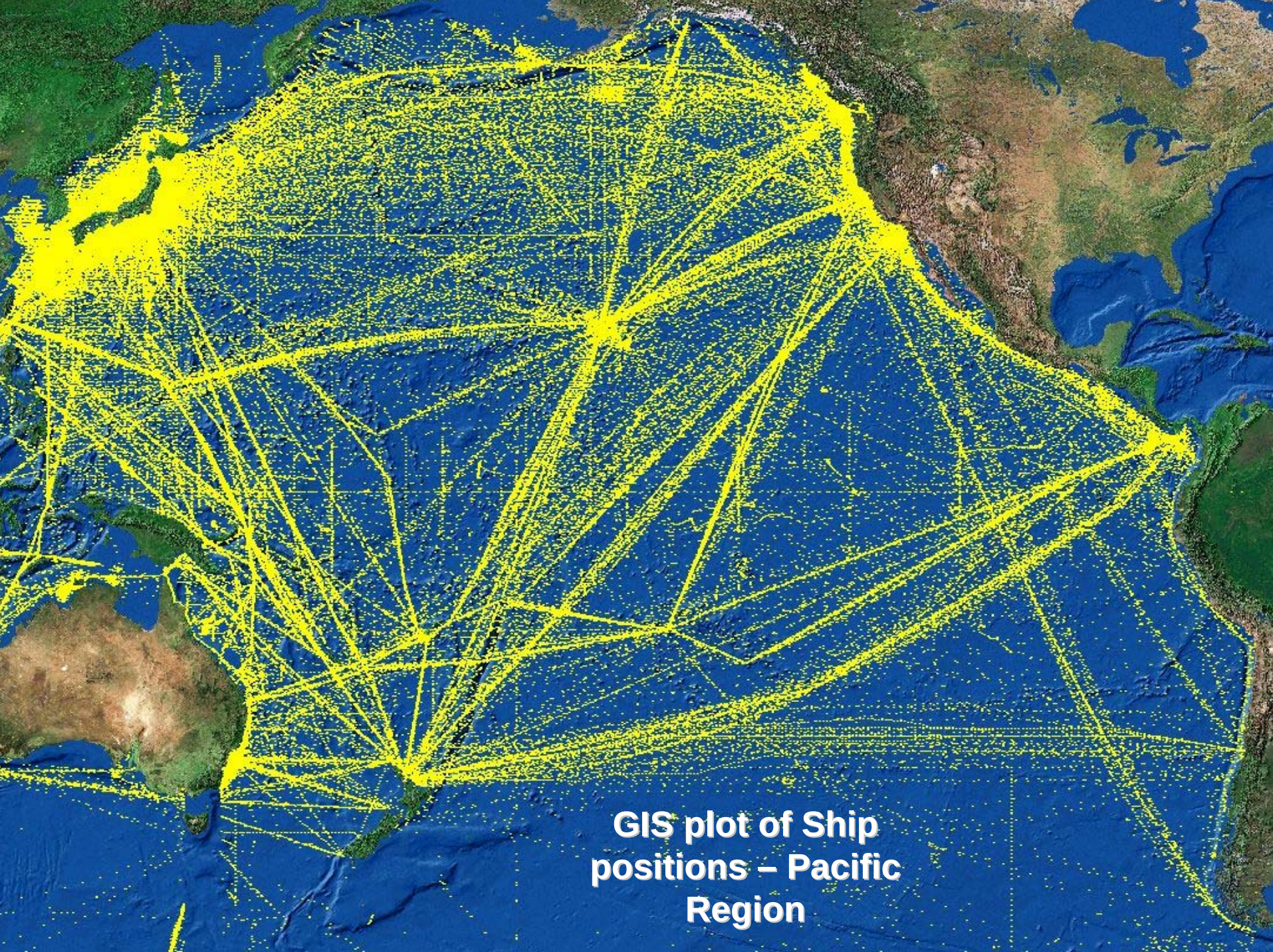
Boats about a long time



Marinas

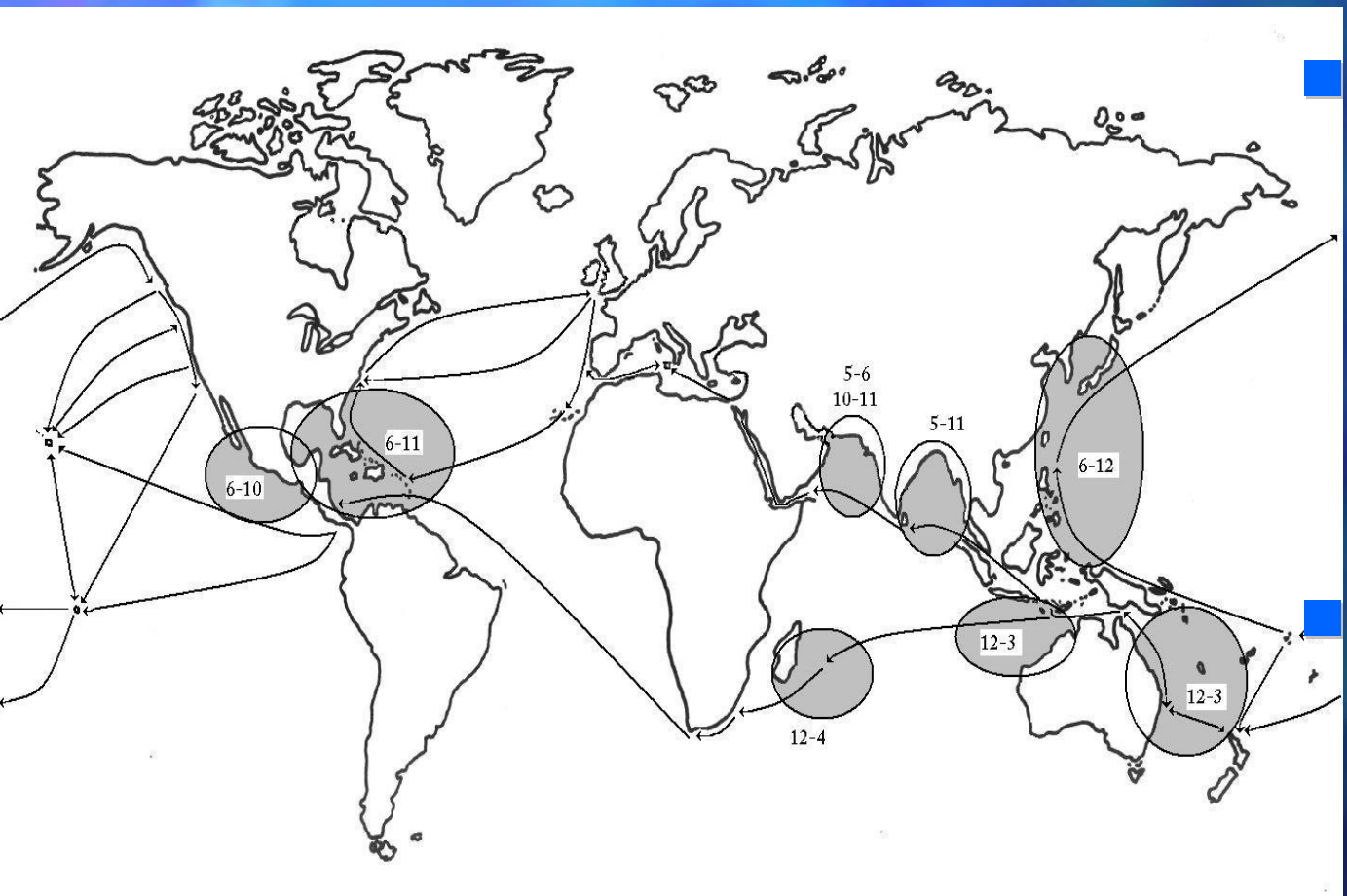
- *Fouling on hulls and pontoons / harbours*
- *Idle boats ca 30 %*
- *Boat sales*





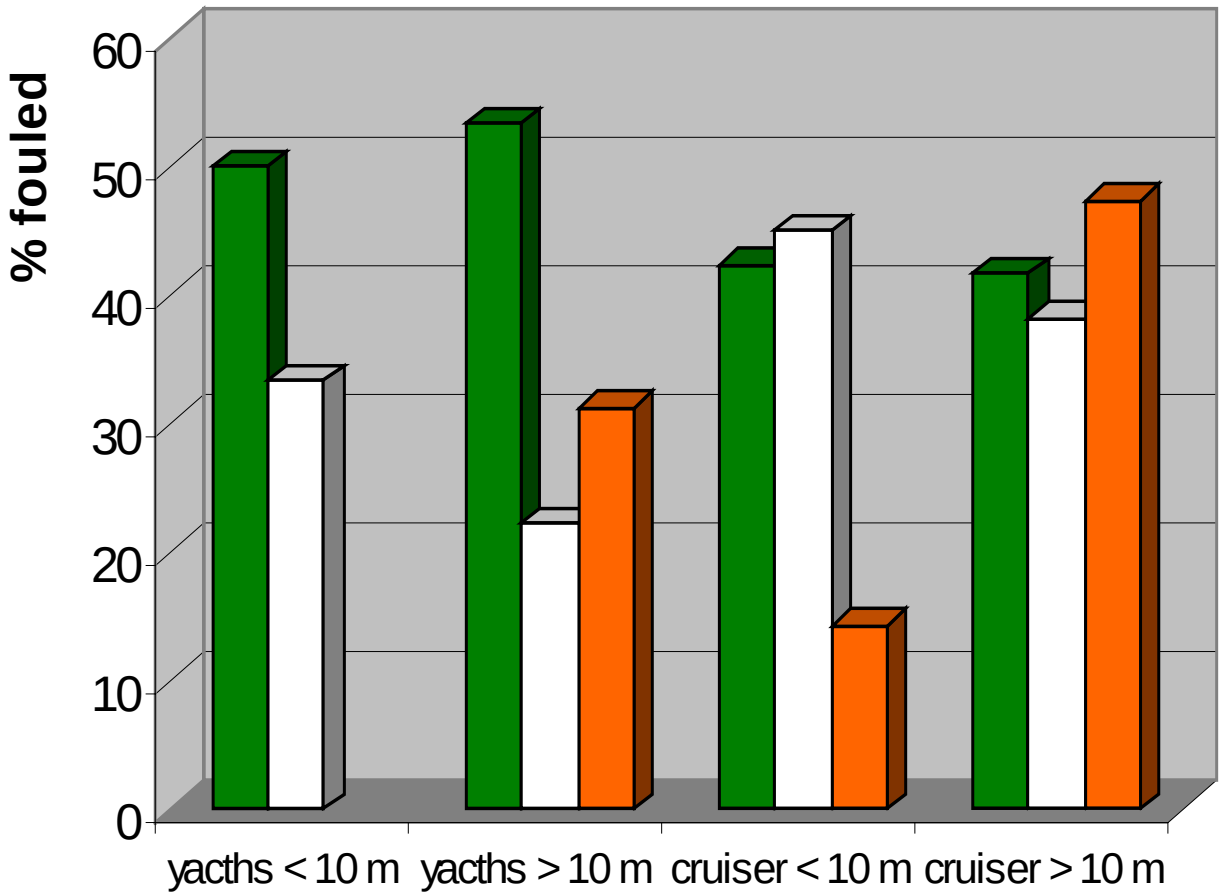
GIS plot of Ship positions – Pacific Region

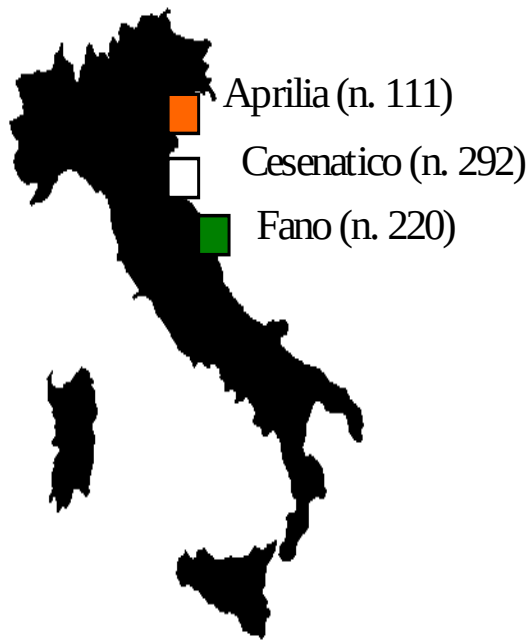
Small craft routes



- Small craft have special routes
- They avoid seasonal storms

Fouling in the Adriatic Sea

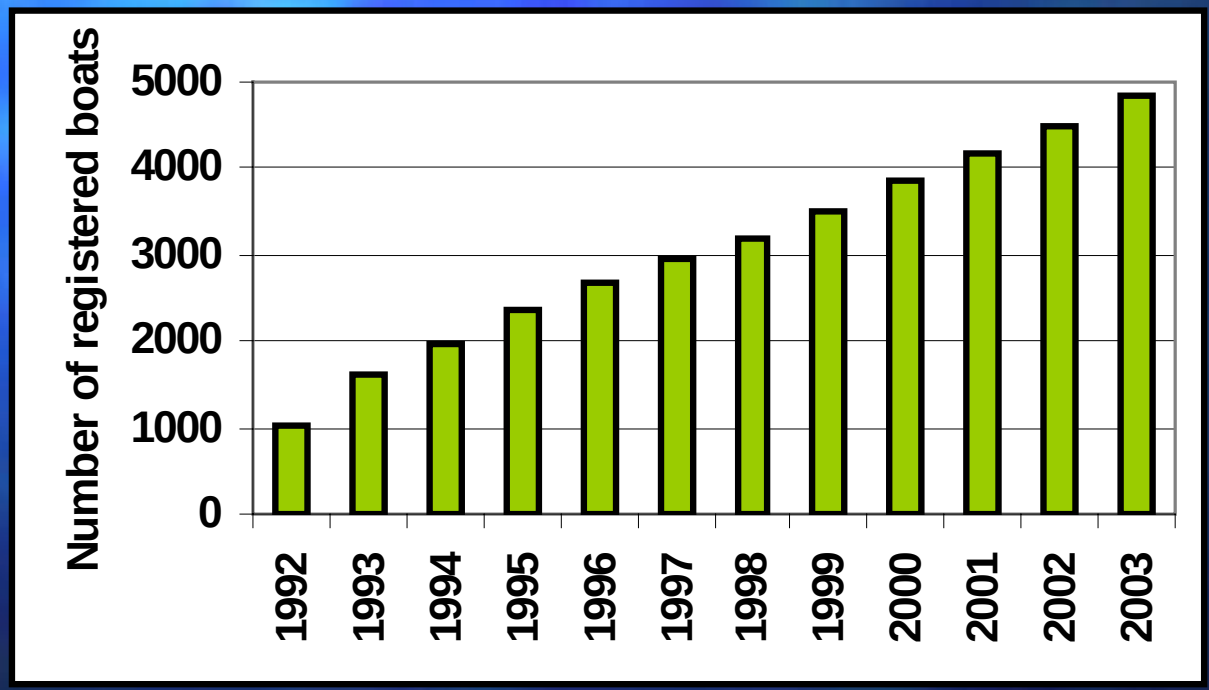




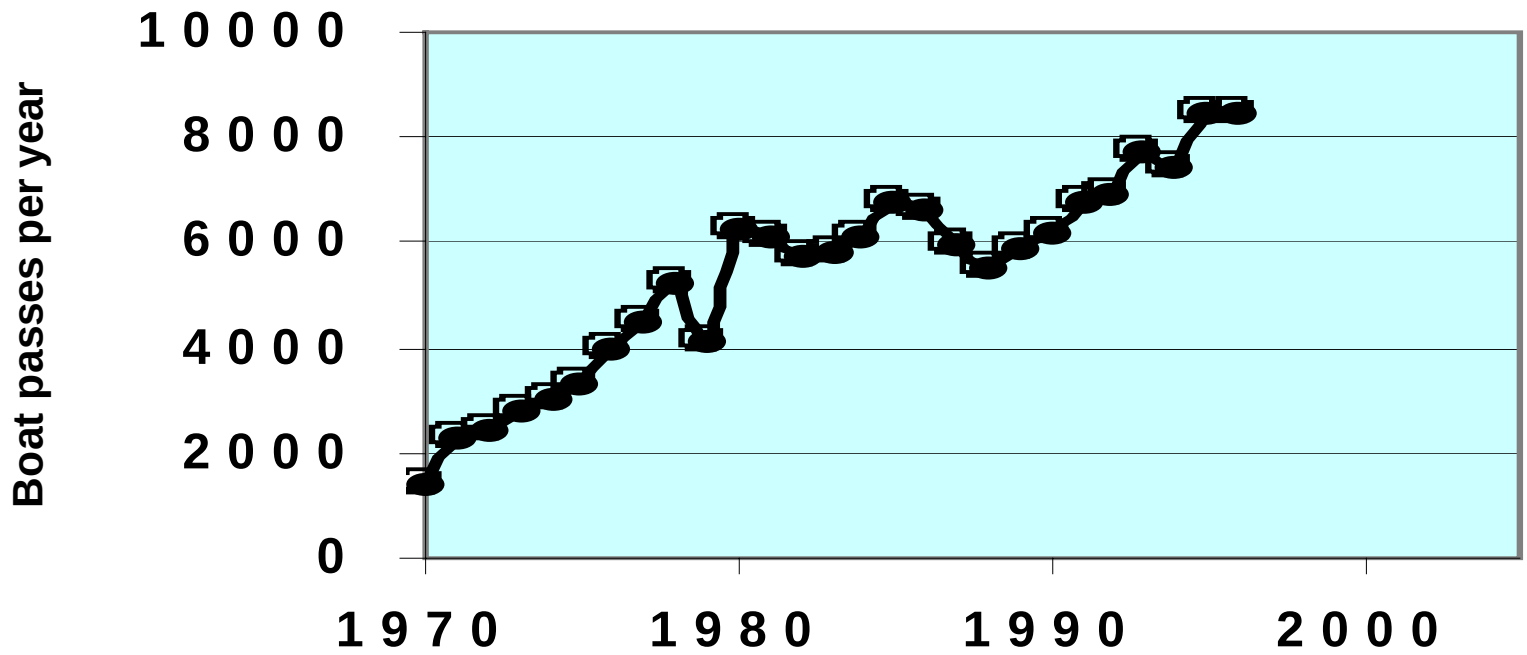
Small craft hulls

- Are often idle
- Many are heavily fouled
- May be effective inoculators
- Visit areas other than ports

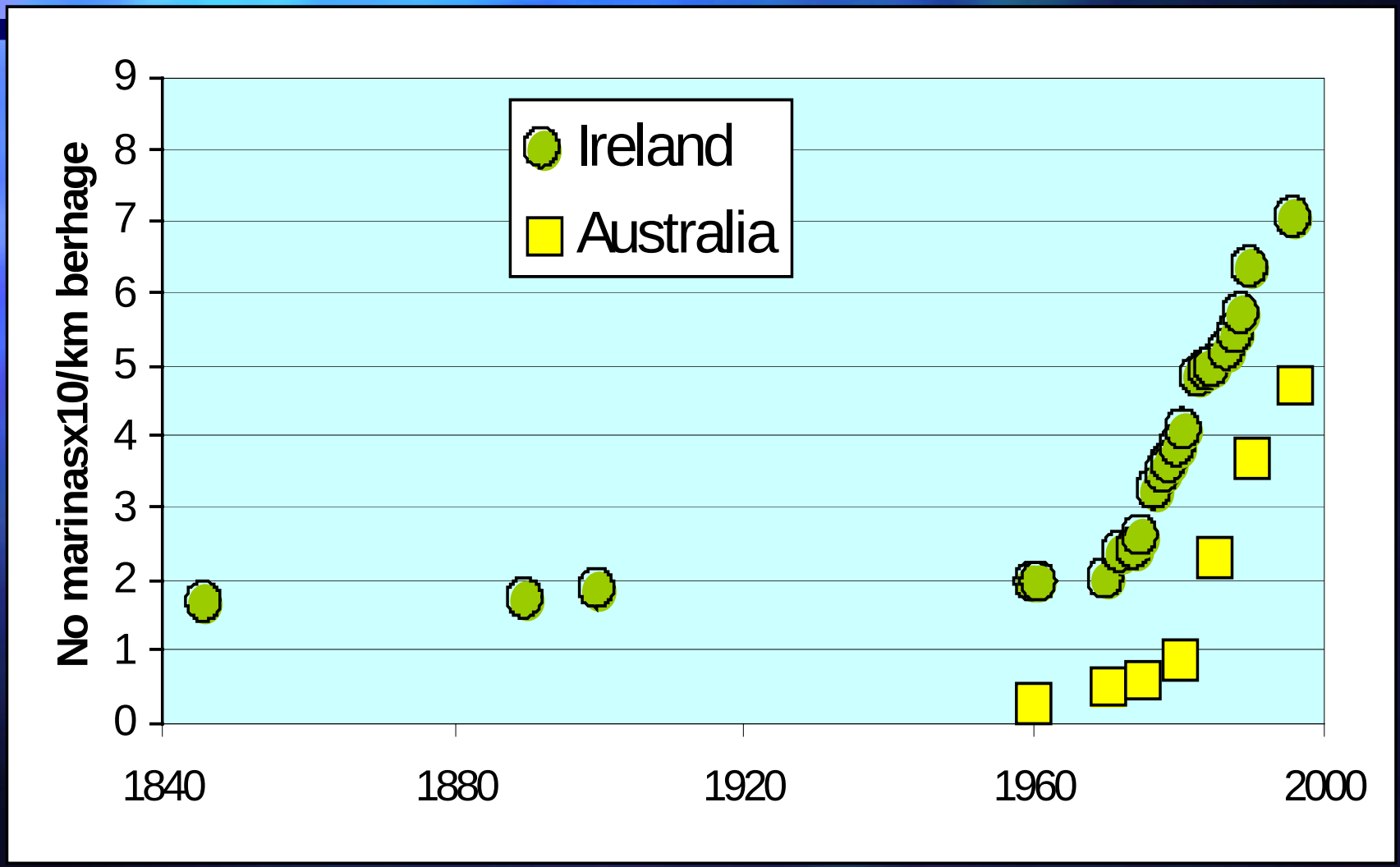
Shannon River increases in number of boats



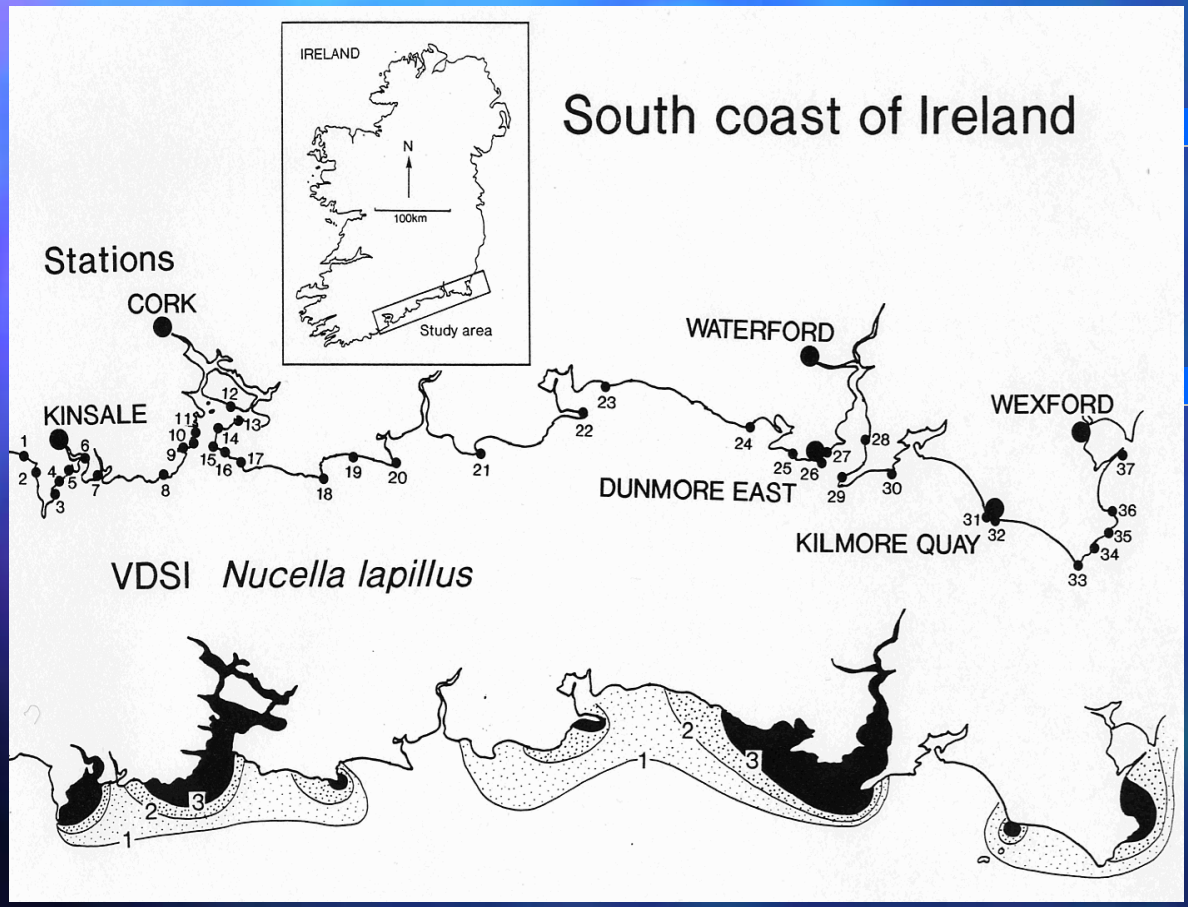
Shannon River increase in traffic



Increase in marinas and berthage

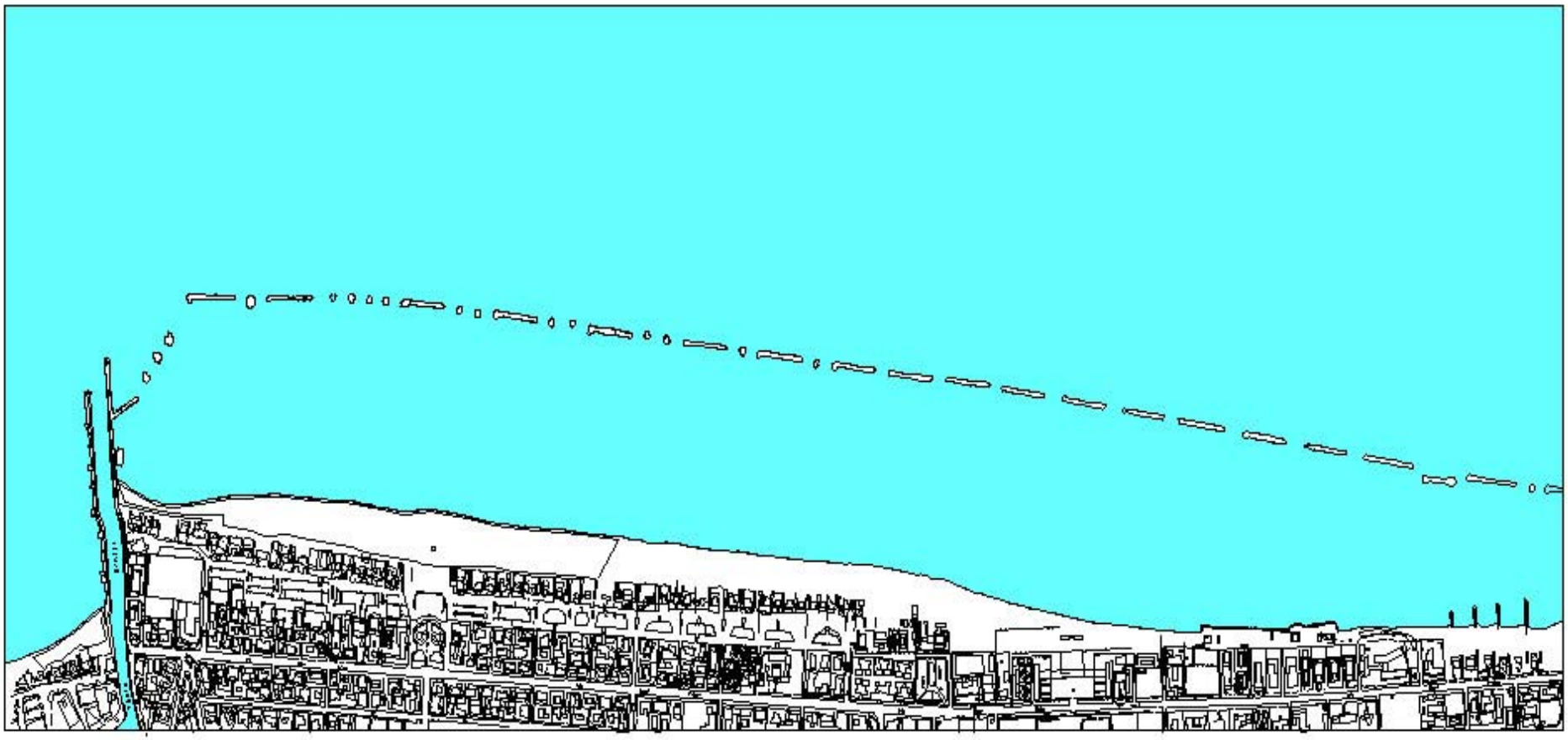


Ports in Estuarys & Bays

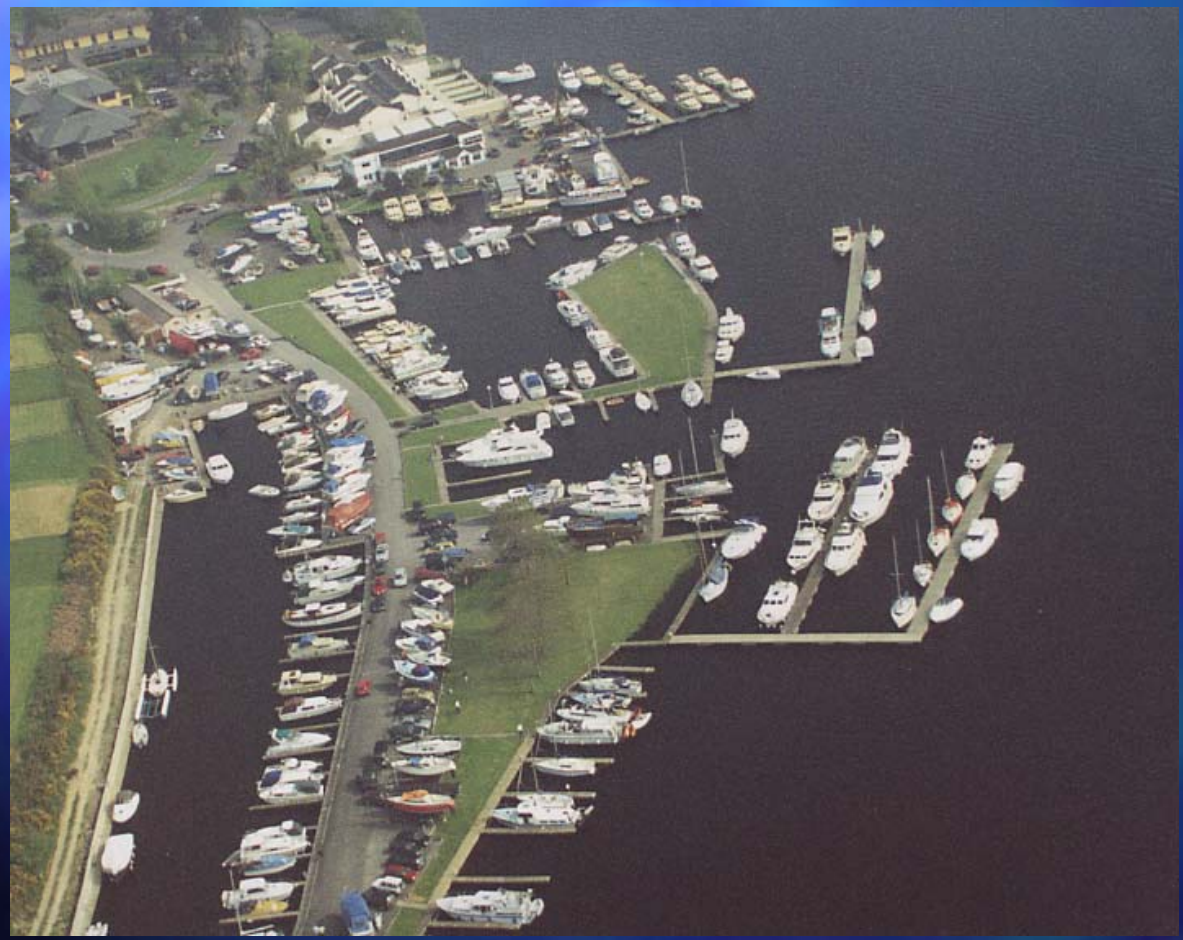


- TBT plumes
- Will invasive species flow along these plumes?

Breakwaters and dispersal plumes



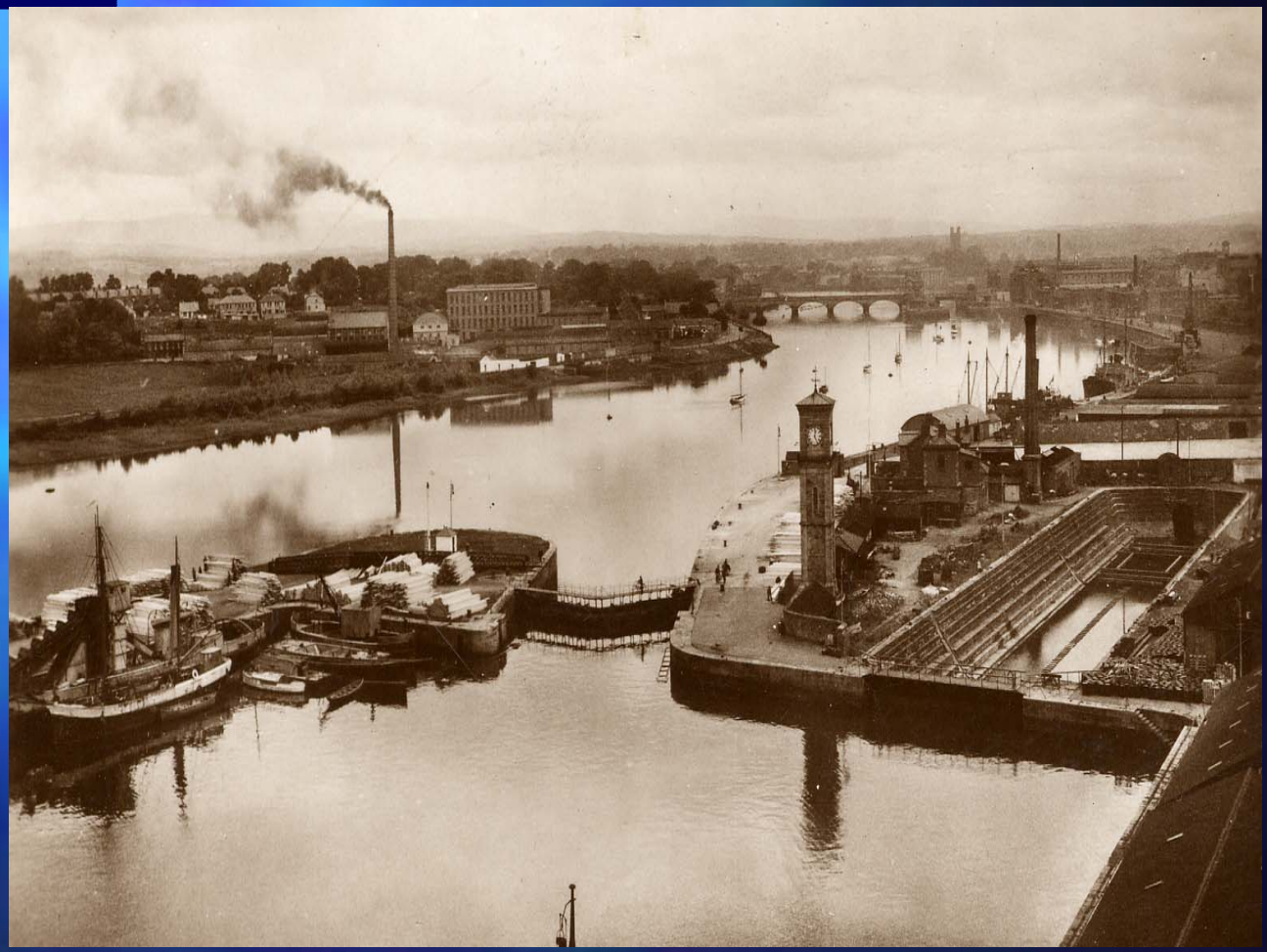
Overlapping Vectors



- Marinas often in port regions

Docks as hub regions

- Low water exchanges
- Similar to Baltic and Mediterranean ports



Breakers yards

- Vessels idle before dissembly
- Scrapings may enter water

Overland/sea transport

- Boats are trailered to slipways and crane-in facilities

Overlapping vectors

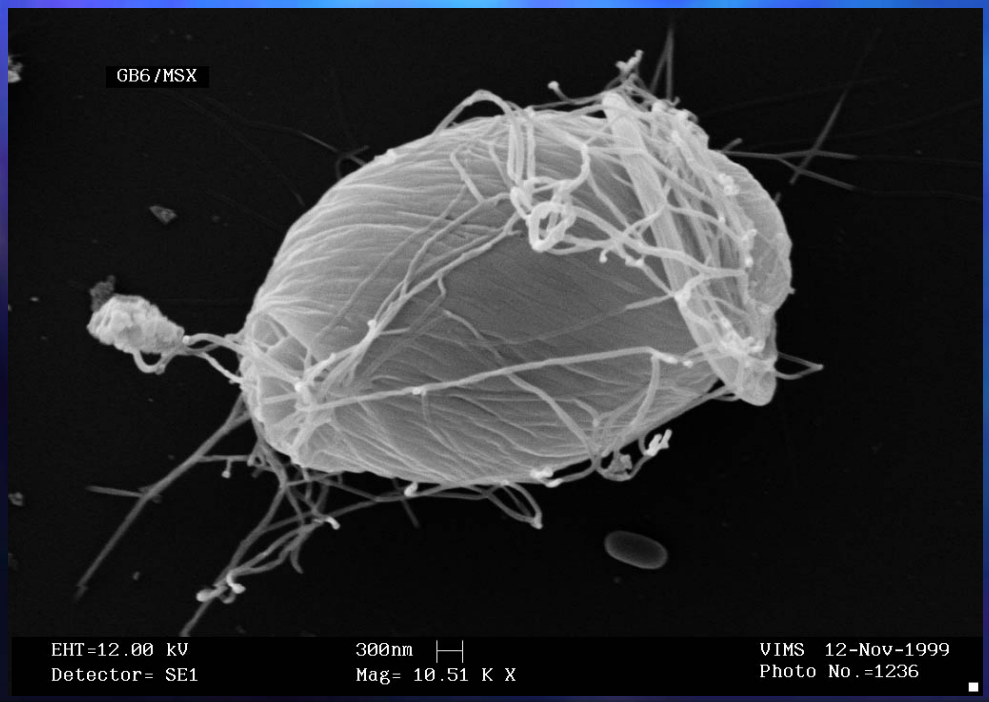
- Dumping of by-catch
- Aquaculture
- Processing wastes

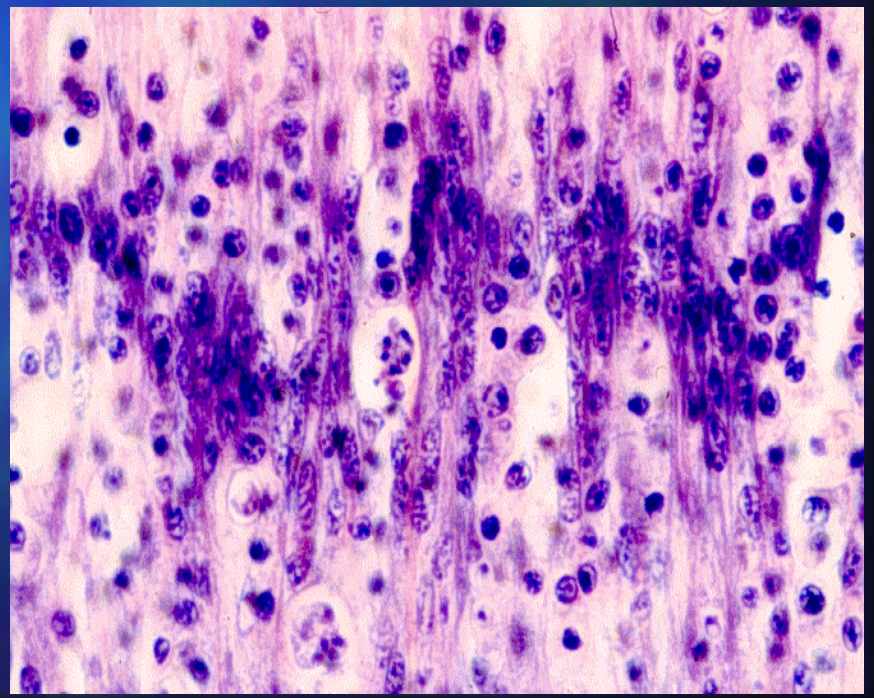
Commercial species on hulls

- Blue mussel 19%
- Pacific oyster 10%
- Horse mussel 3%
- Flat oyster 2%
- Olympic oyster 2%
- Soft shell clam 2%
- Surf clams 2%

Oysters can carry diseases

- *Haplosporidium* | *Minchinia nelsoni* (protozoan)
- *Dermocystidium marinus* = *Perkensis marinus* (fungus)
- *ADVICE:* Do not introduce infected hosts





Establishment in hub areas

- Can arise from spawnings
- Scrapings being released
- Drop-off of clusters

Vectors

- Angling boats are freely moved between lakes

Small boats

- What numbers are sufficient to create a new inoculum

Baitfish

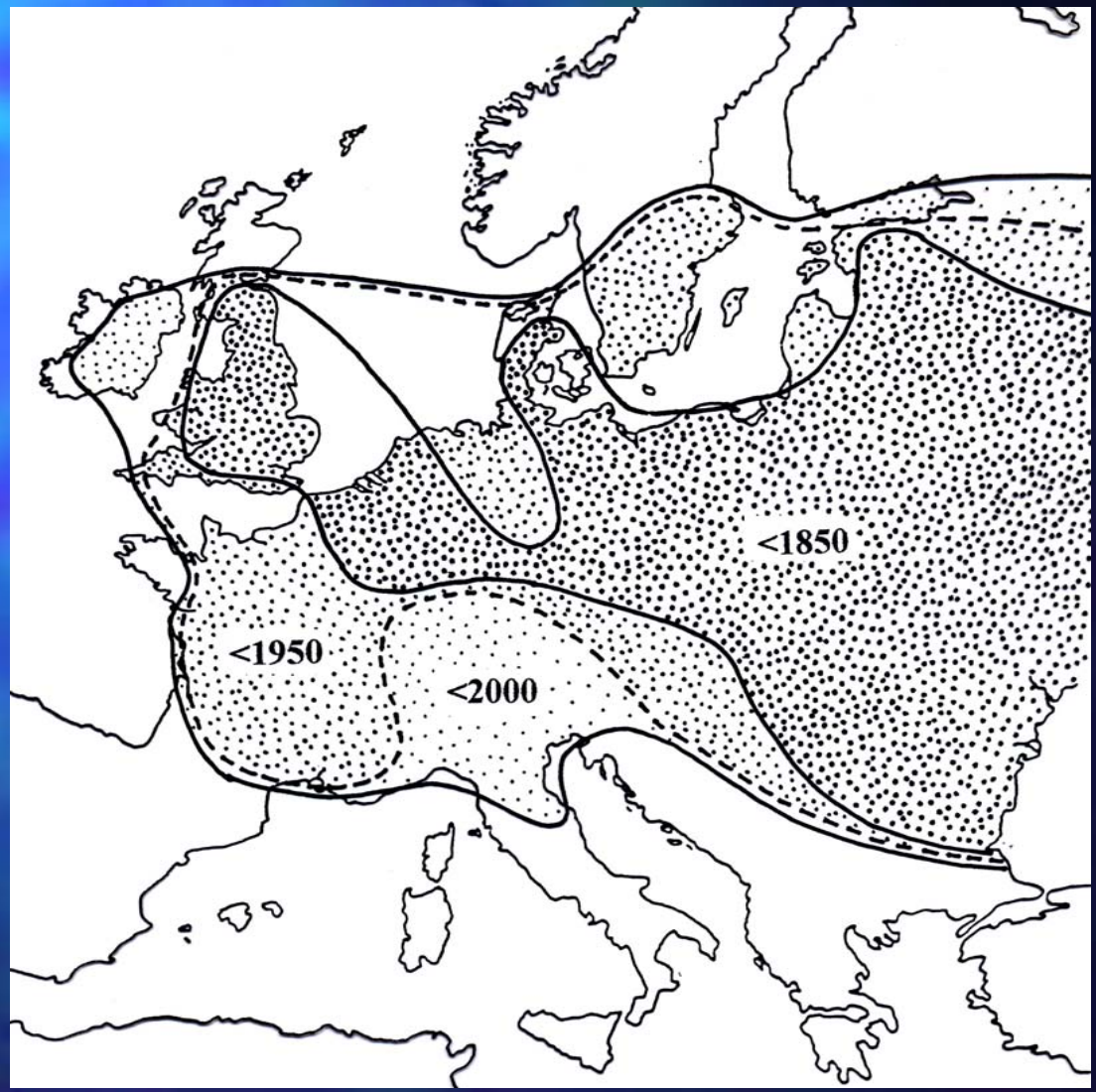
- Releases can become established

Management

- Many introductions are unexpected
- It is effective to undertake a risk analysis

Distribution

- Expanded from Black and Caspian Seas late 1700's
- Arrived Britain 1824
- Arrived Ireland 1993?



Failure modes and effects analysis

- Mooring chains can also become fouled

Zebra mussels
Highest risk craft

Examined:

Fouling locations and frequency

Boat behaviour

Result:

Hulls (10,000's)

Overland movement of lake boats

High density fouling

- Serpulid worms

Management

- Needs to handle more than one matter at a time

Climate changes

- Extreme storm events leading to stock escapes

- Increased temperatures and species ranges and new opportunities for exotic species

Co-operation

- Working with invasive species is an international issue

Thank you for your attention

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