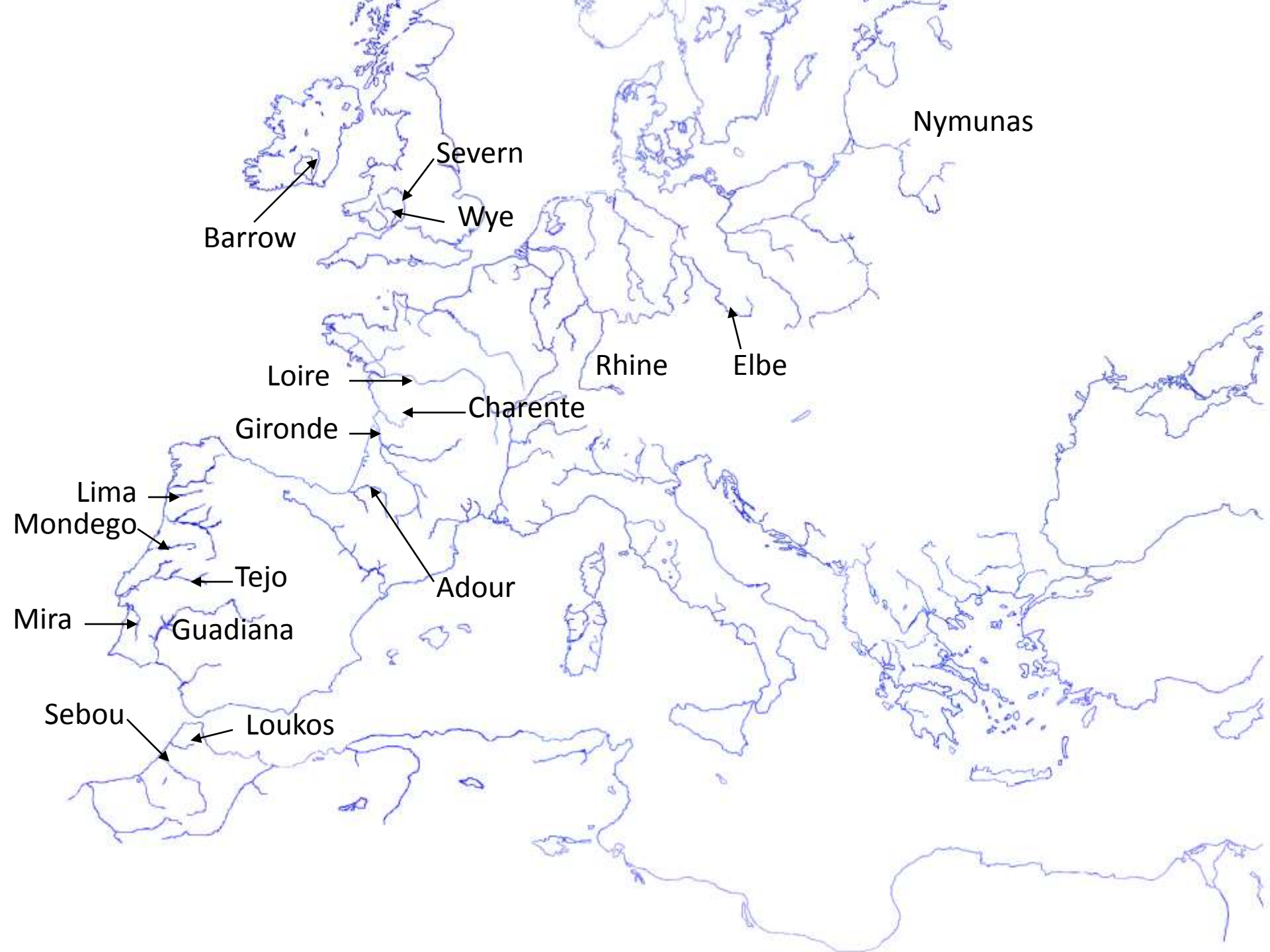
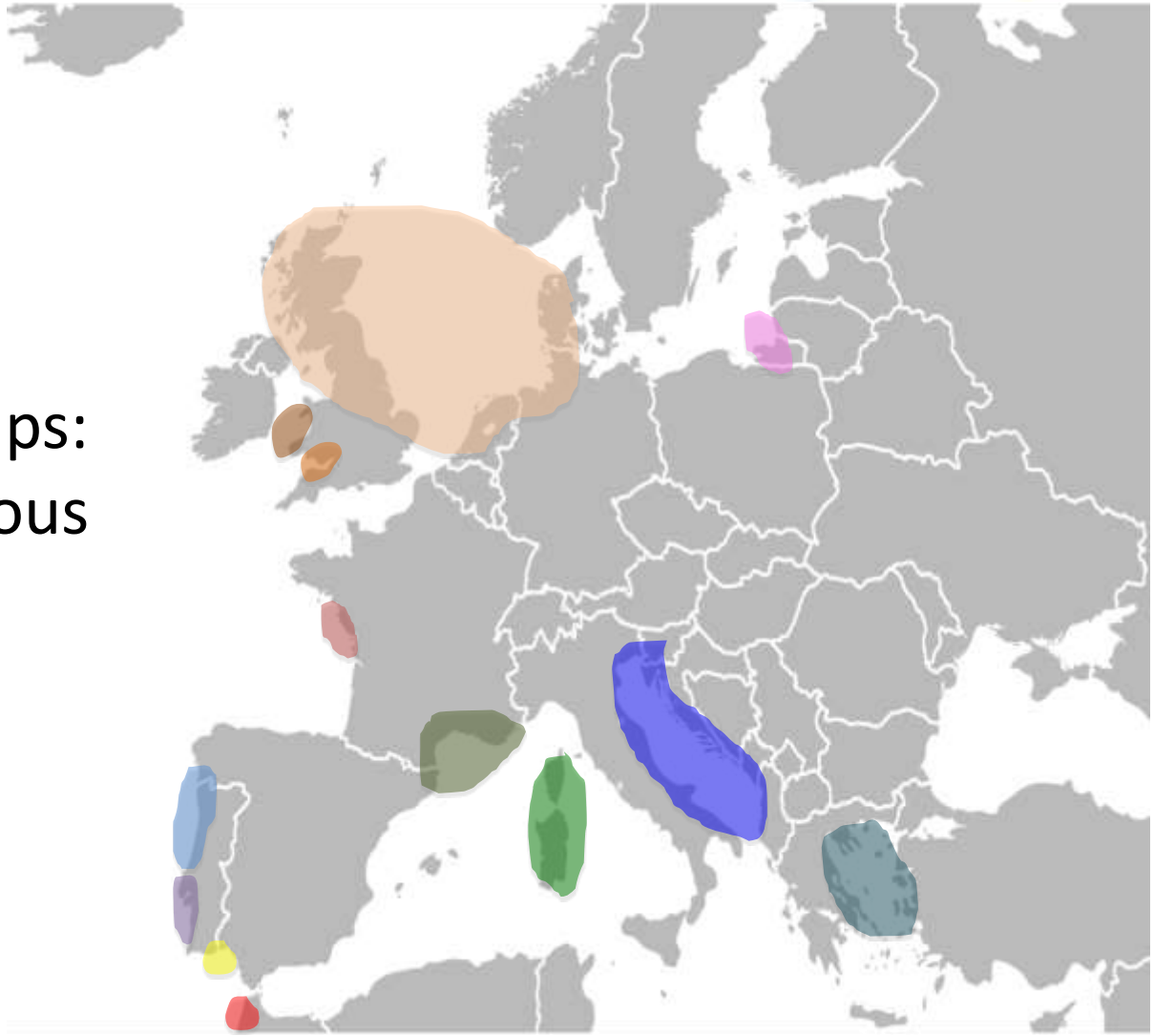
The Twaite shad in Europe : situation and conservation issues

Miran Aprahamian


Nymunas
Severn
Wye
Barrow
Rhine
Elbe
Loire
Charente
Gironde
Lima
Mondego
Tejo
Adour
Mira
Guadiana
Sebou
Loukos

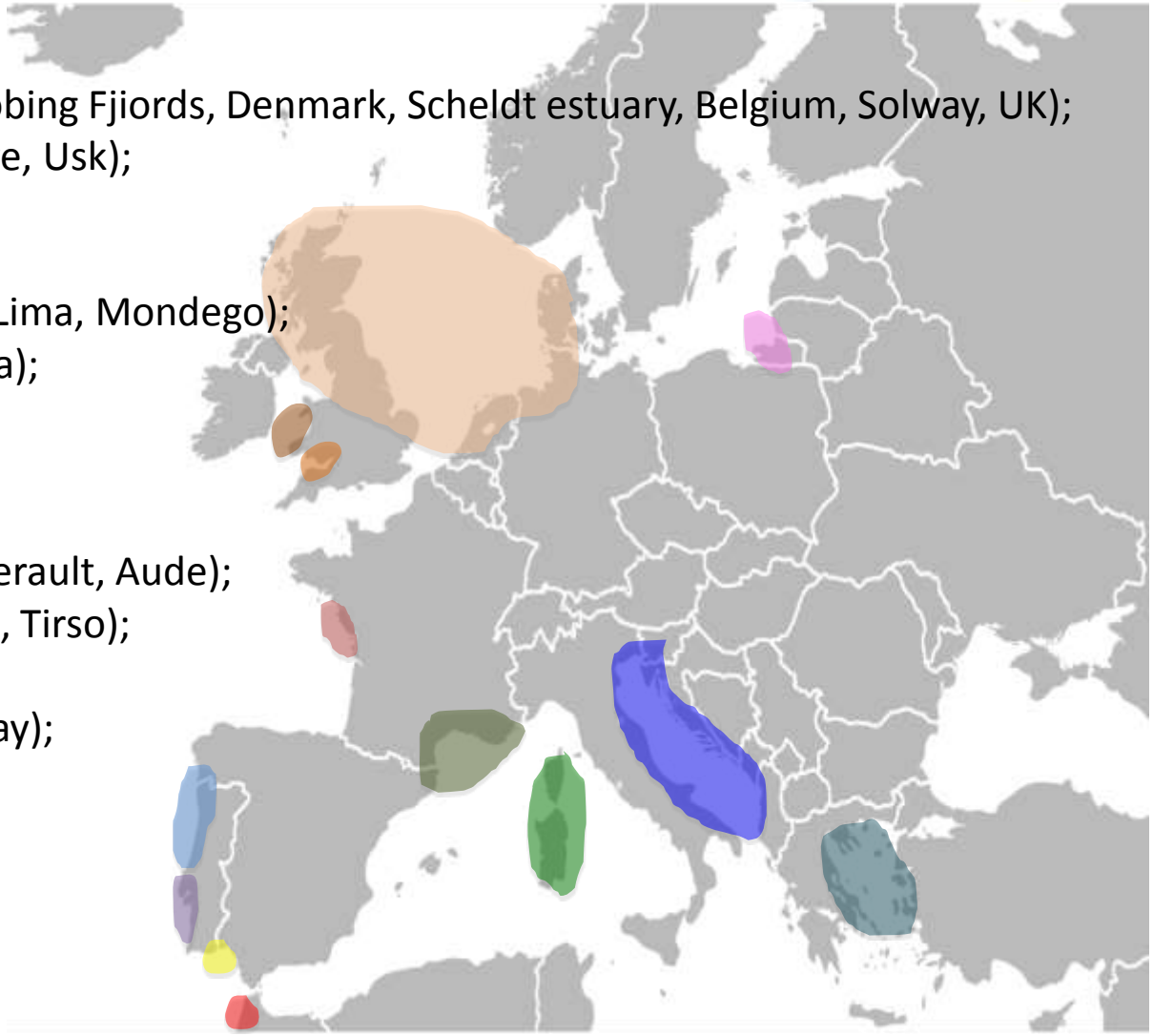
Alosa fallax

- 17 Genetic groups:
  - 13 anadromous
  - 4 landlocked



(data from Sabatino et al., 2015/submitted; Jolly et al., 2012; Rougemont, 2012).

Atlantic:
1- Baltic sea (Curonian lagoon);
2- north Sea (Nissum and Ringkobing Fjiords, Denmark, Scheldt estuary, Belgium, Solway, UK);
3- Severn group, UK (Severn, Wye, Usk);
4- Towy, UK;
5 - west France (Charente);
6 – northwest Portugal (Minho, Lima, Mondego);
7- southwest Portugal (Tejo, Mira);
8 - south Portugal (Guadiana);
9 - Morocco (Sebou);
Mediterranean:
10 – Southern France (Rhone, Herault, Aude);
11 – Corsica/Sardinia (Tavignano, Tirso);
12 – Adriatic (Po, lake Skadar);
13 – Aegean Sea (Pinios, Izmir bay);
Landlocked populations:
14- Killarney, Ireland;
15 – lake Maggiore, Italy;
16 – lake Como, Italy;
17 – lake Garda, Italy

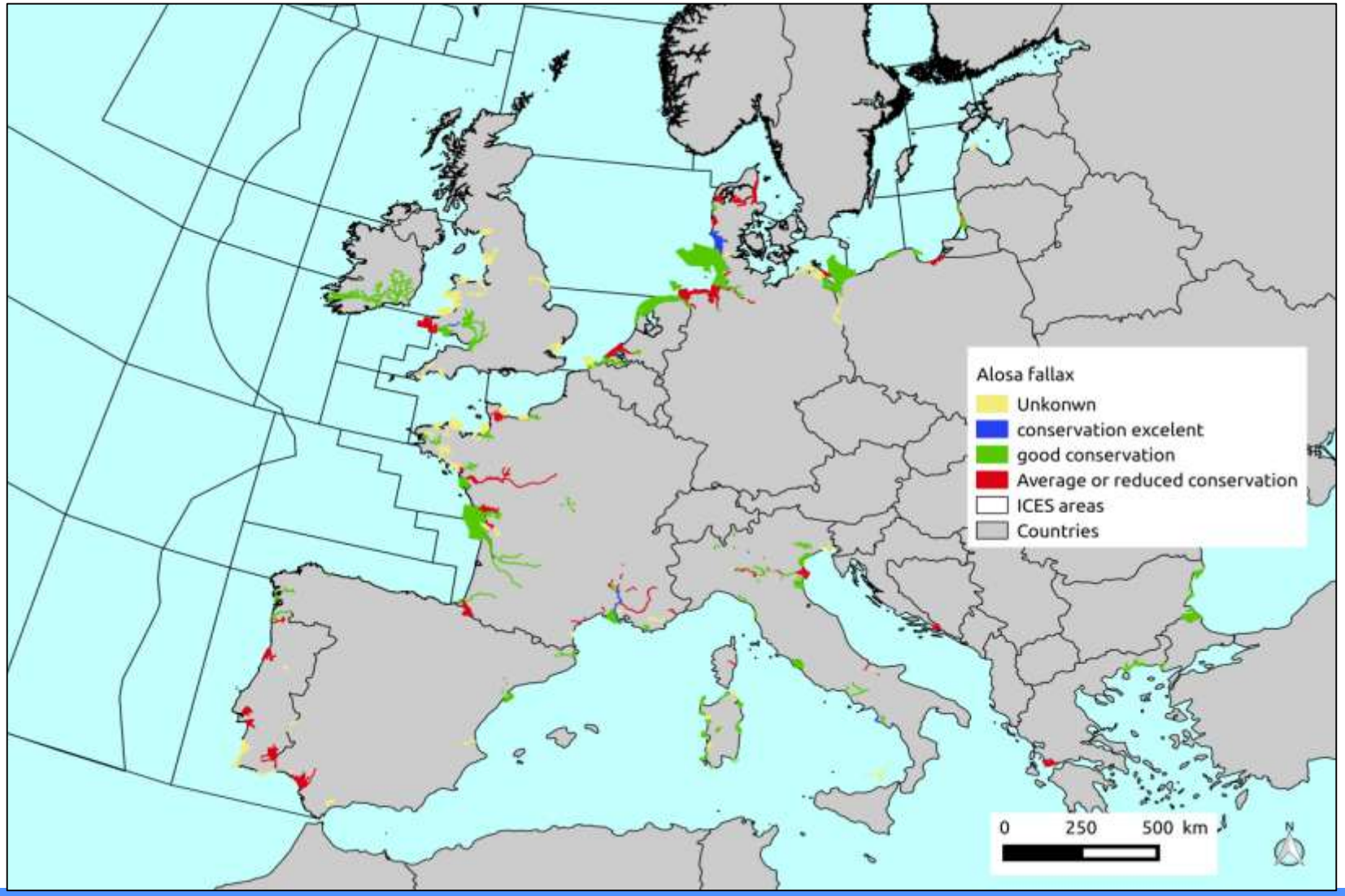


(Sabatino et al., 2015/ submitted).

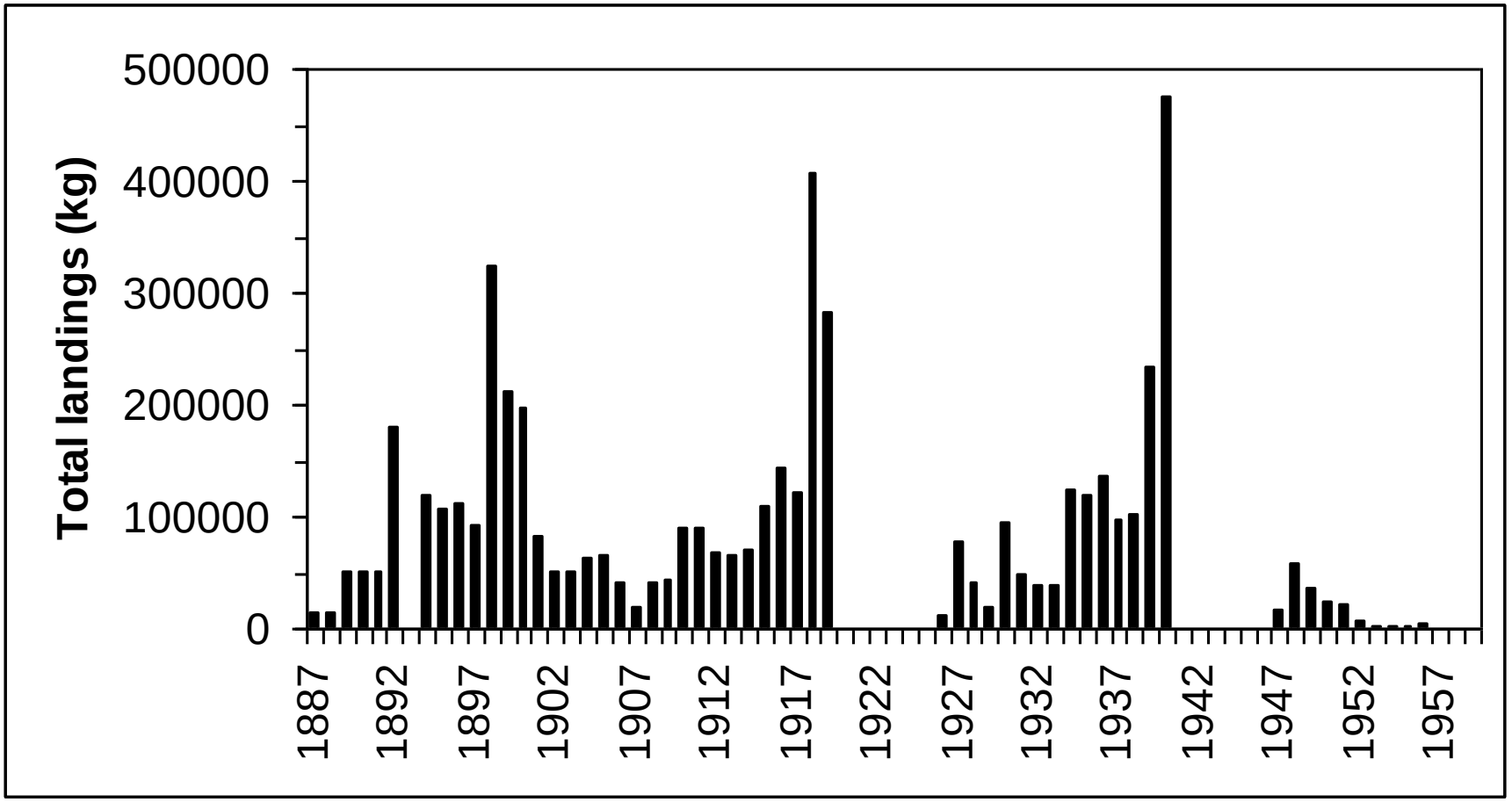
Conservation status

Conservation status	IUCN (1994) criteria	Countries
Extinct	When there is no reasonable doubt that the last individual has died	Belgium, Luxembourg, Sweden, Netherlands
Critically endangered	When it is facing an extremely high risk of extinction in the wild in the immediate future	Denmark
Endangered	When it is not critically endangered but is facing an extremely high risk of extinction in the wild in the near future	Germany, Lithuania, Poland
Vulnerable	When it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future	Ireland, France, Portugal, Spain, UK
Not evaluated	When it has not been assessed against the criteria	Finland
Data deficient	When there is inadequate information to make a direct [or] indirect, assessment of its risk of extinction based on its distribution and/or population status	Sweden
Absent from red data book or equivalent		Austria

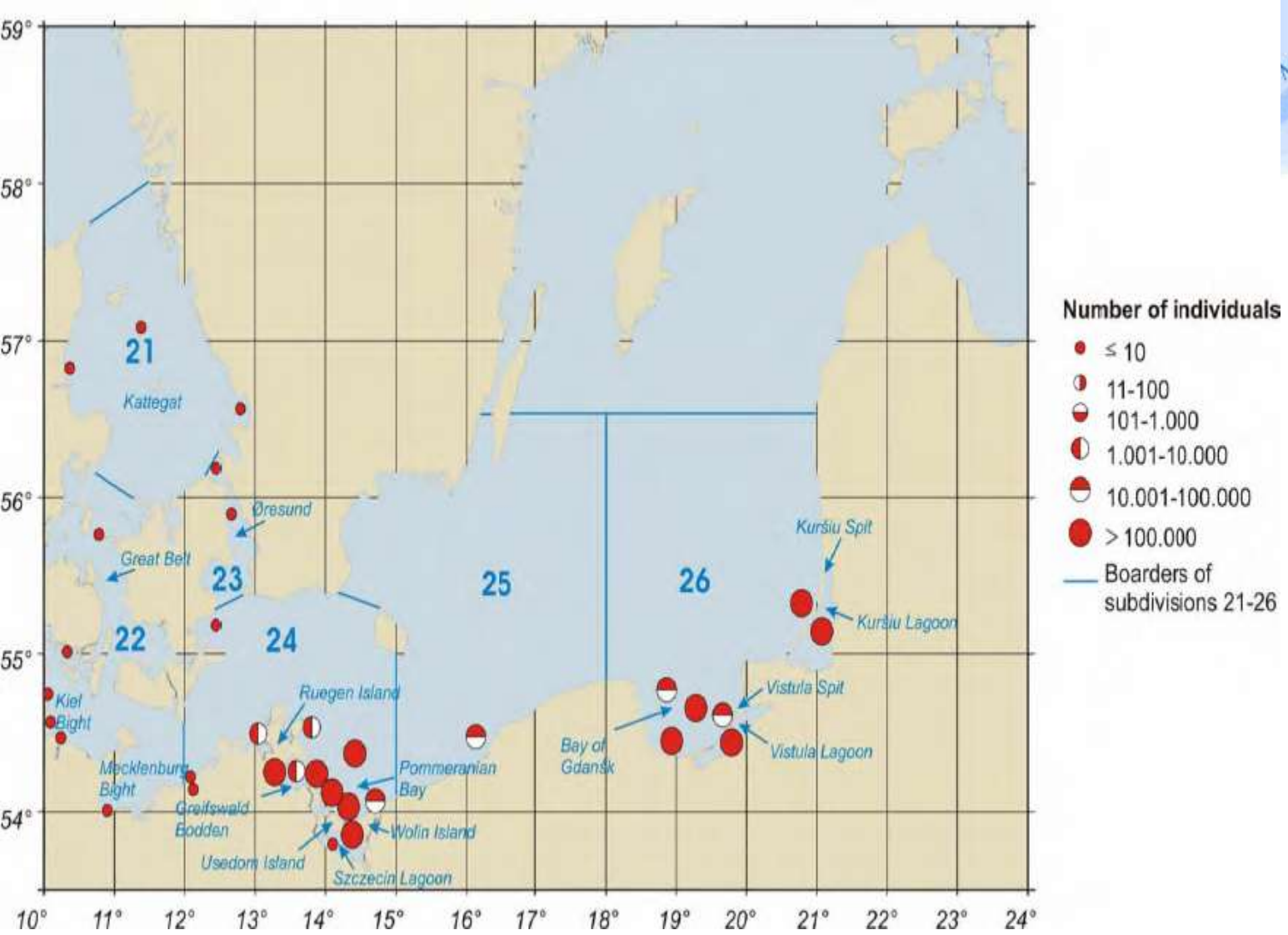
Conservation status



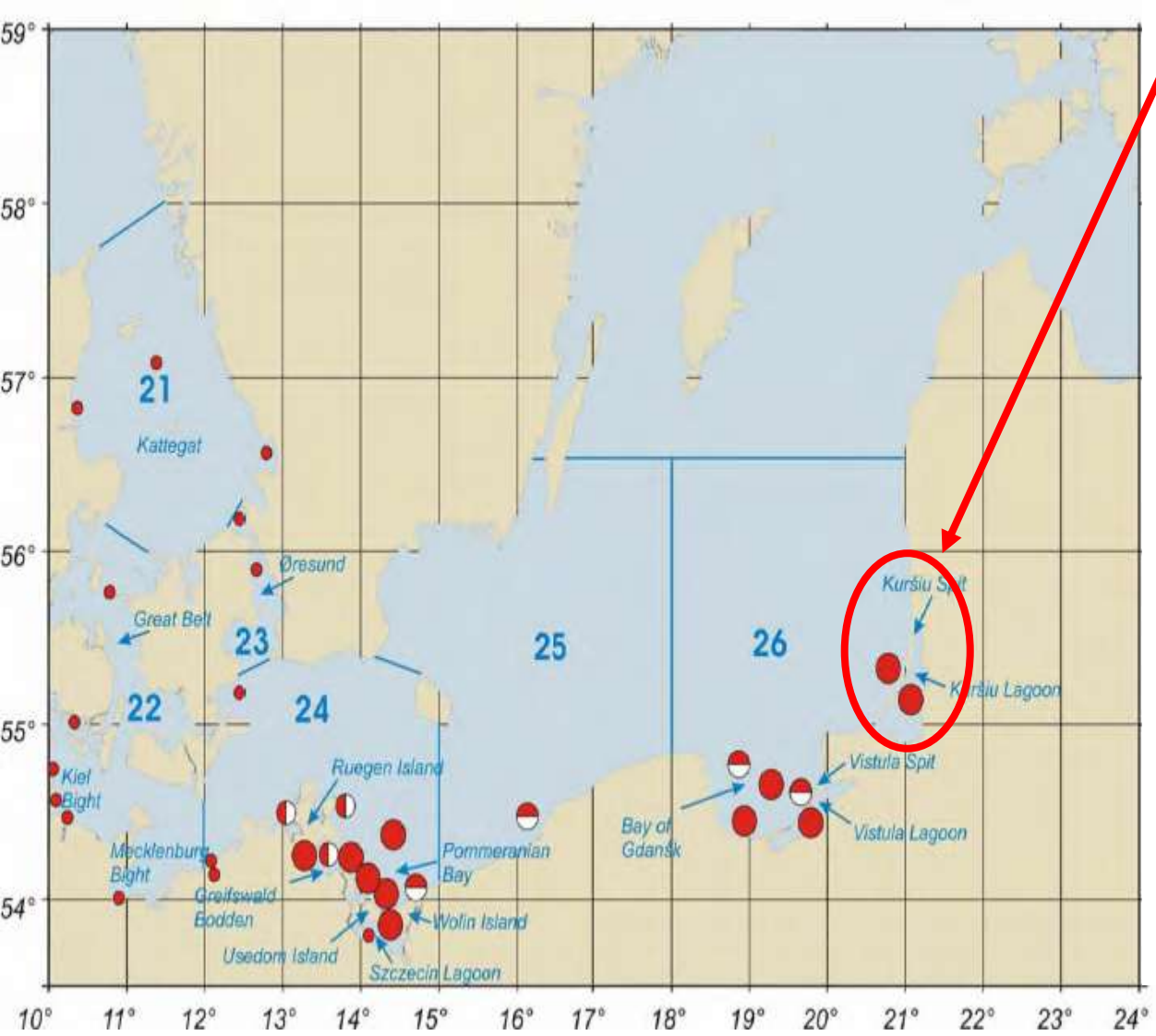
Total landings of twaite shad in the Southern Baltic Sea (ICES subdivisions 24-26) from 1887- 1959.



No catch statistics available during the time periods 1920–1925 (crisis years of the Weimar Republic) and 1941–1946 (World War II), from Thiel *et al*. (2008).



Distribution of historical records of twaite shad in subdivisions 21 – 26 of the Baltic Sea in the time period 1800 – 1949 (Thiel *et al*., 2004).



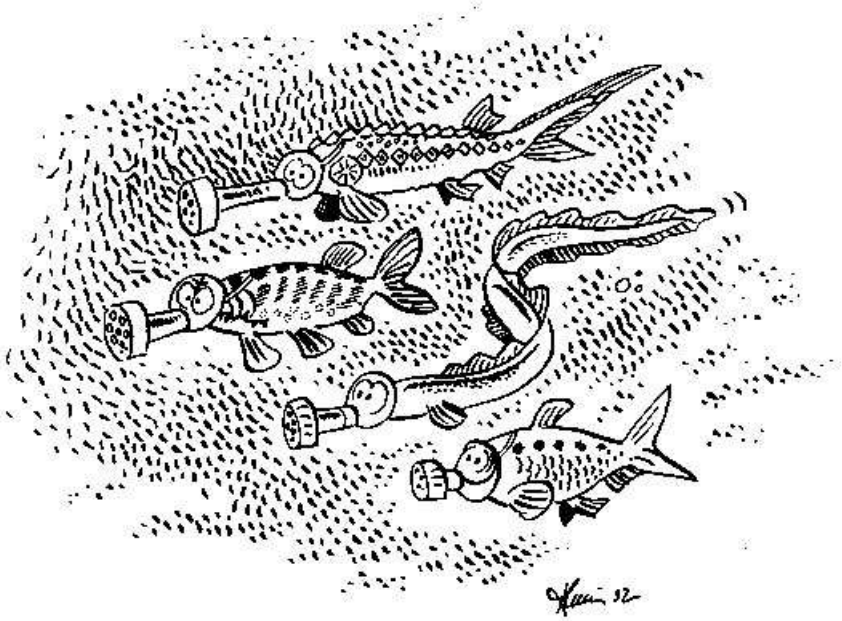
Catches ~100t yr-1

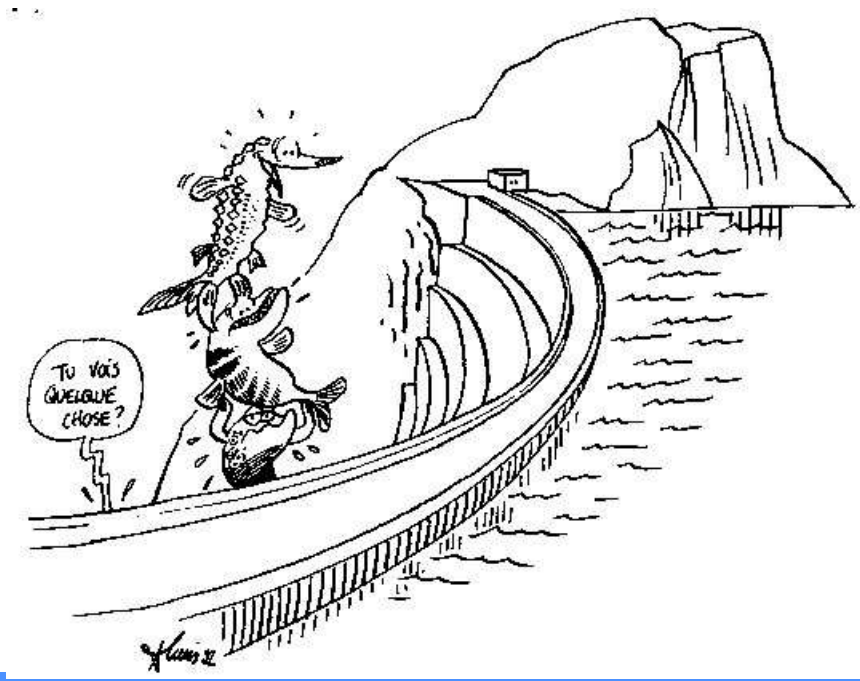
1) a 2-3 fold reduction in phosphates, nitrates and BOD_7 in the River Nemunas and Curonian Lagoon,
2) the deepening of the Klaipeda Strait (1984-6) improving access to the Nemunas and
3) the ban on catching and landing twaite shad (Maksimov, 2004).

This led to twaite shad being removed from the Red Data Book of Lithuania.

Distribution of historical records of twaite shad in subdivisions 21 – 26 of the Baltic Sea in the time period 1800 – 1949 (Thiel *et al*., 2004).

Conservation Action





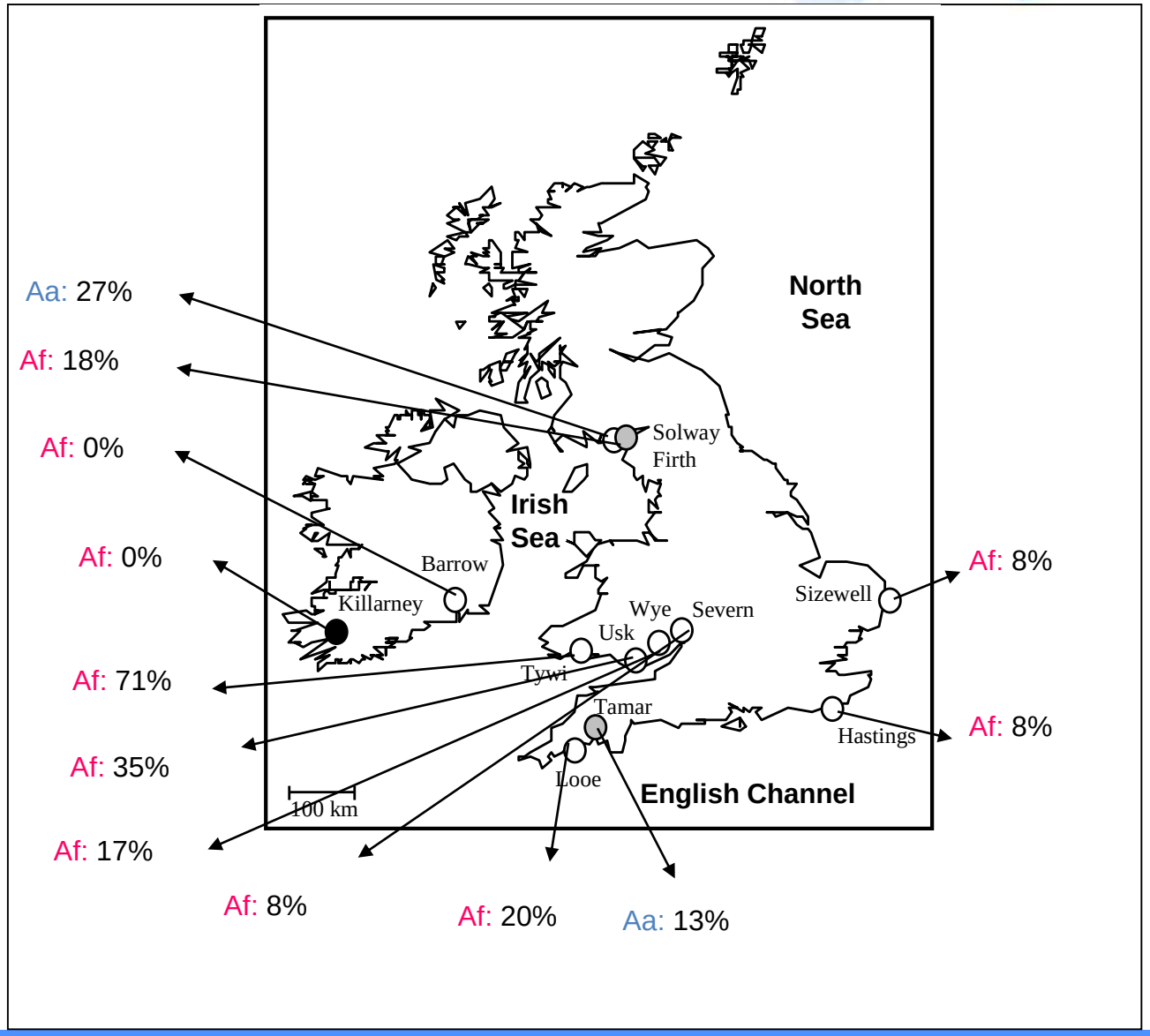
Clondulane Weir – first barrier to shads on Munster Blackwater SAC – SNIFFER Survey 9.2014

Fermoy Weir – second barrier on Munster Blackwater SAC (200 m crest)

Tidal lagoons

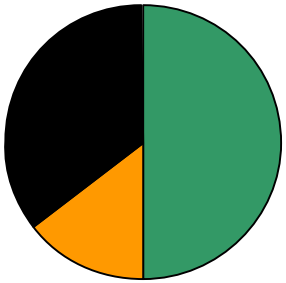
Reduction of genetic diversity –

Hybridization

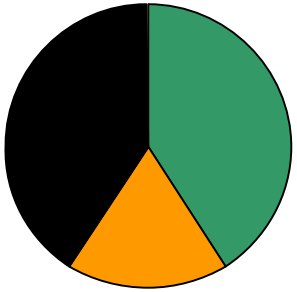


Jolly *et al.*, 2012

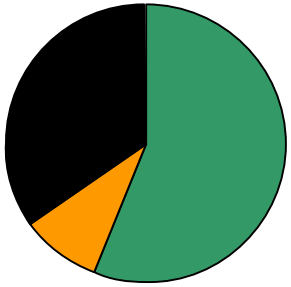
Improved accessibility for shad in England & Wales



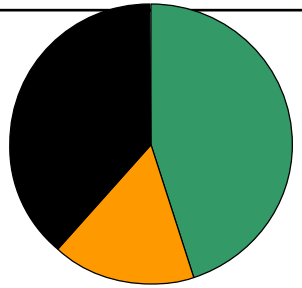
(a) Proportion of habitat area, 1999.



(c) Proportion of habitat length, 1999.



(b) Proportion of habitat area, 2012.



(d) Proportion of habitat length, 2012.

	Area (ha)		Length (km)	
	1999	2012	1999	2012
Good Access	1177 (50%)	1298 (56%)	240 (41%)	265 (45%)
Poor Access	343 (15%)	212 (9%)	108 (18%)	96 (16%)
Inaccessible	843 (36%)	802 (35%)	241 (41%)	228 (39%)

Green = Good access;
Yellow = Poor access;
Black = Inaccessible.

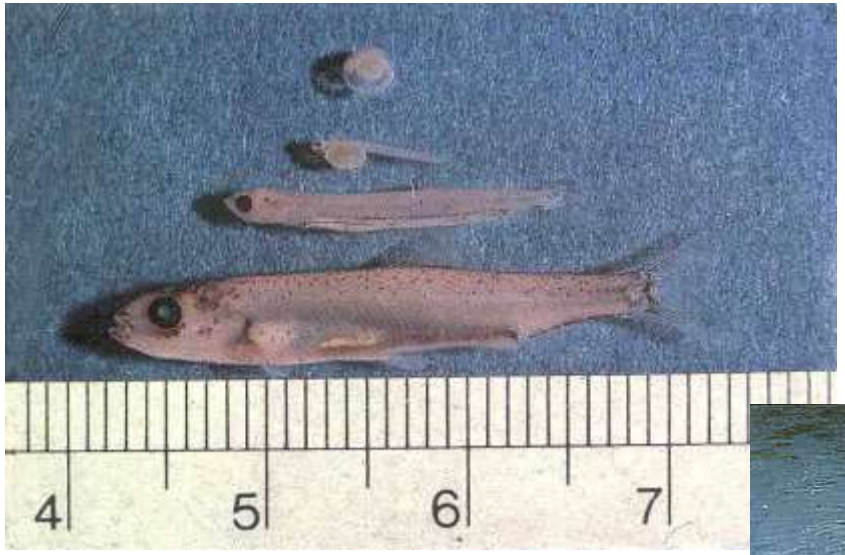
Conservation Measures

- Sanctuary areas
- Fish passes
- Culture
- Translocation

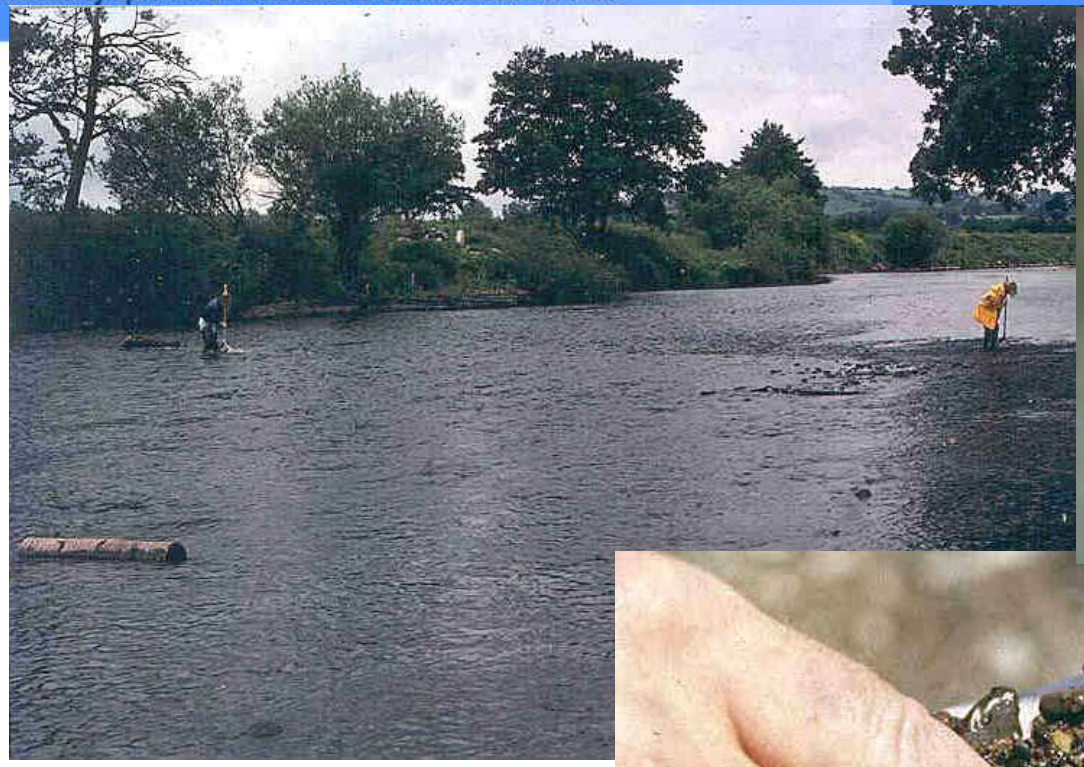
- Legislative change
  - Habitats Directive

Issues & Challenges

- Early life history
- Biological requirements
- Marine life history
- Population dynamics
- Monitoring - status of populations



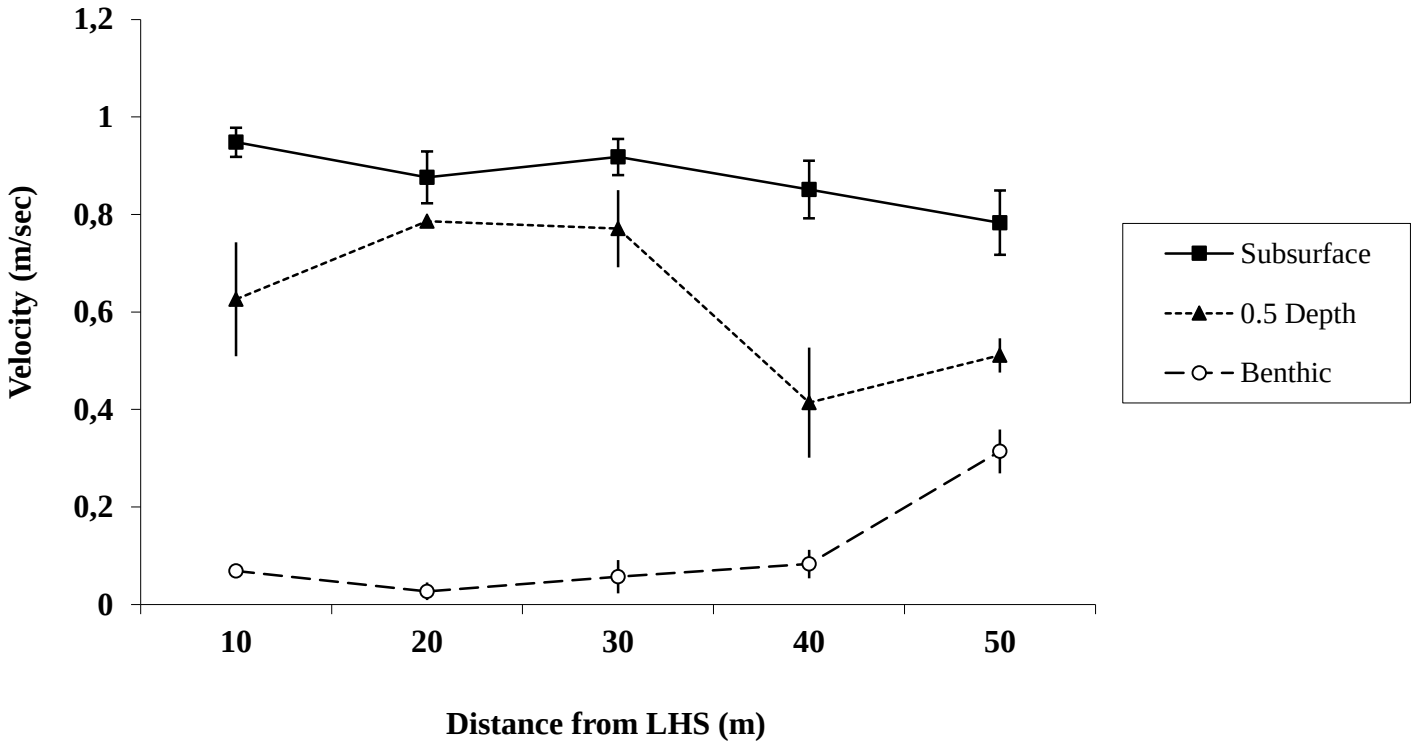
Egg and larval stages



Spawning grounds and Substrate

Spawning habitat surveys

R. Barrow: Velocity distribution across transect at spawning location, low tide

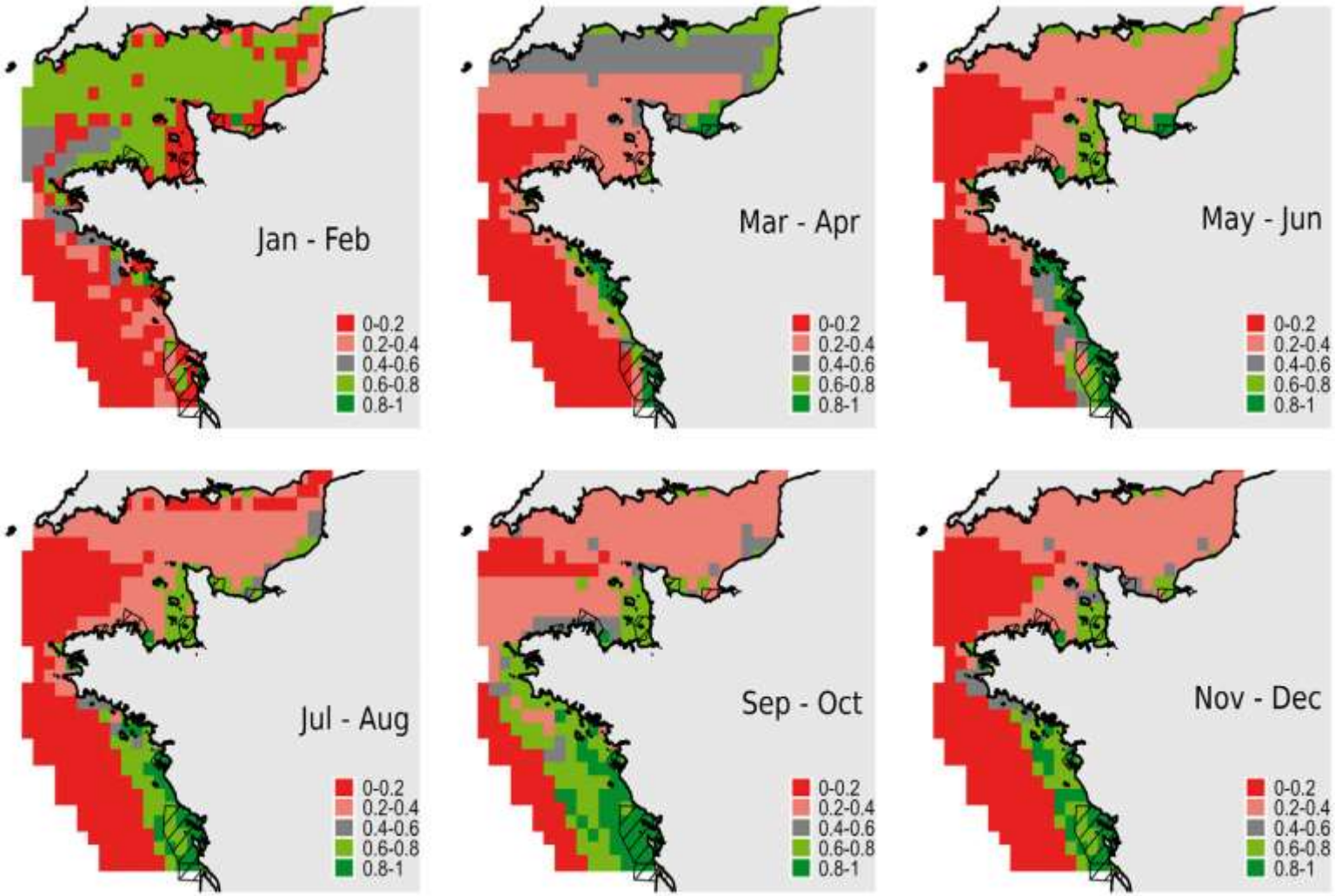


Water quality - Dissolved O_2

- Juvenile *Alosa fallax* require >4 mgL^{-1} (Möller & Scholz, 1991).

- Adult *Alosa fallax* require > 5 mg l^{-1} to ensure passage upstream through the estuary (Maes *et al*.,2008)

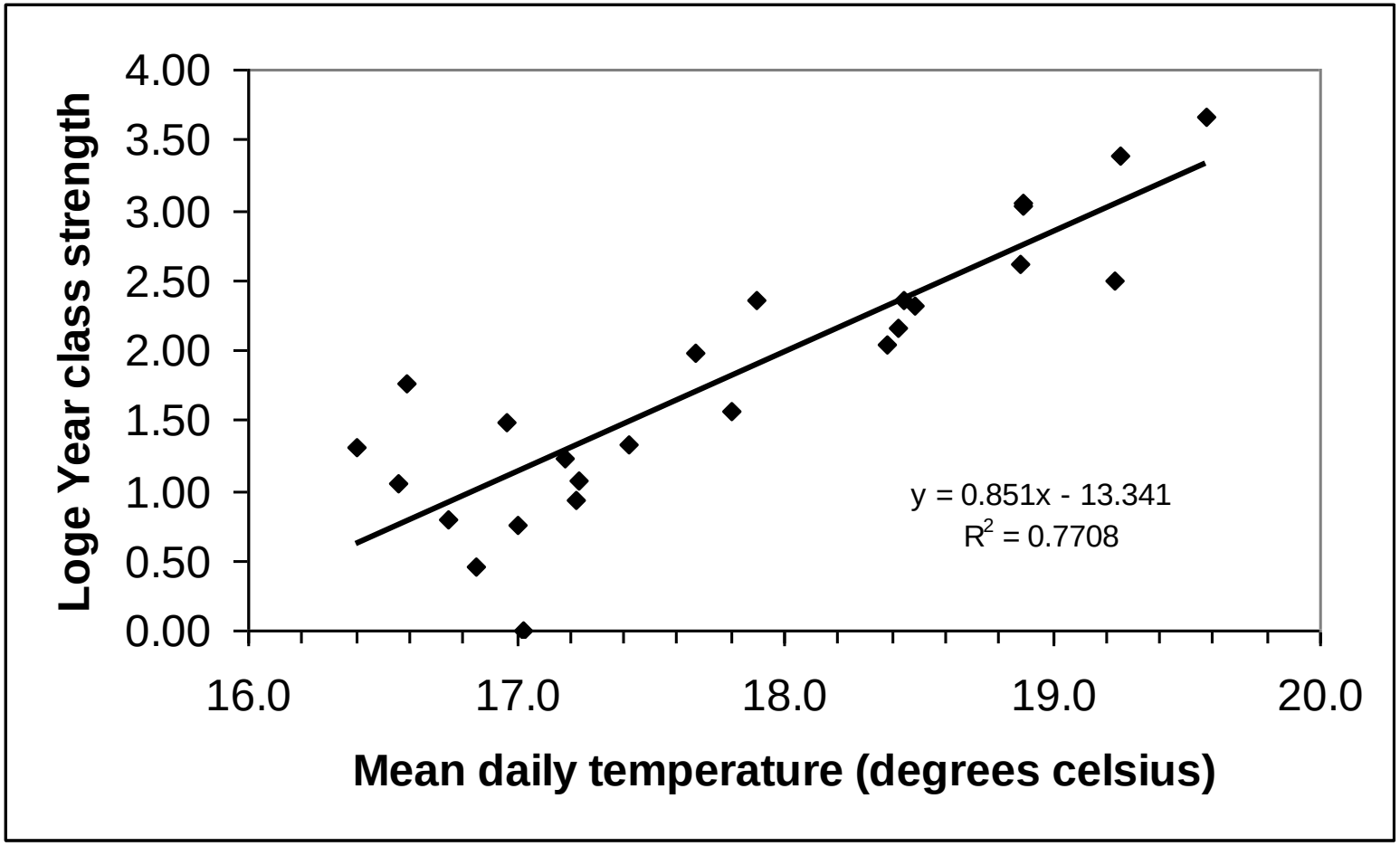
At sea



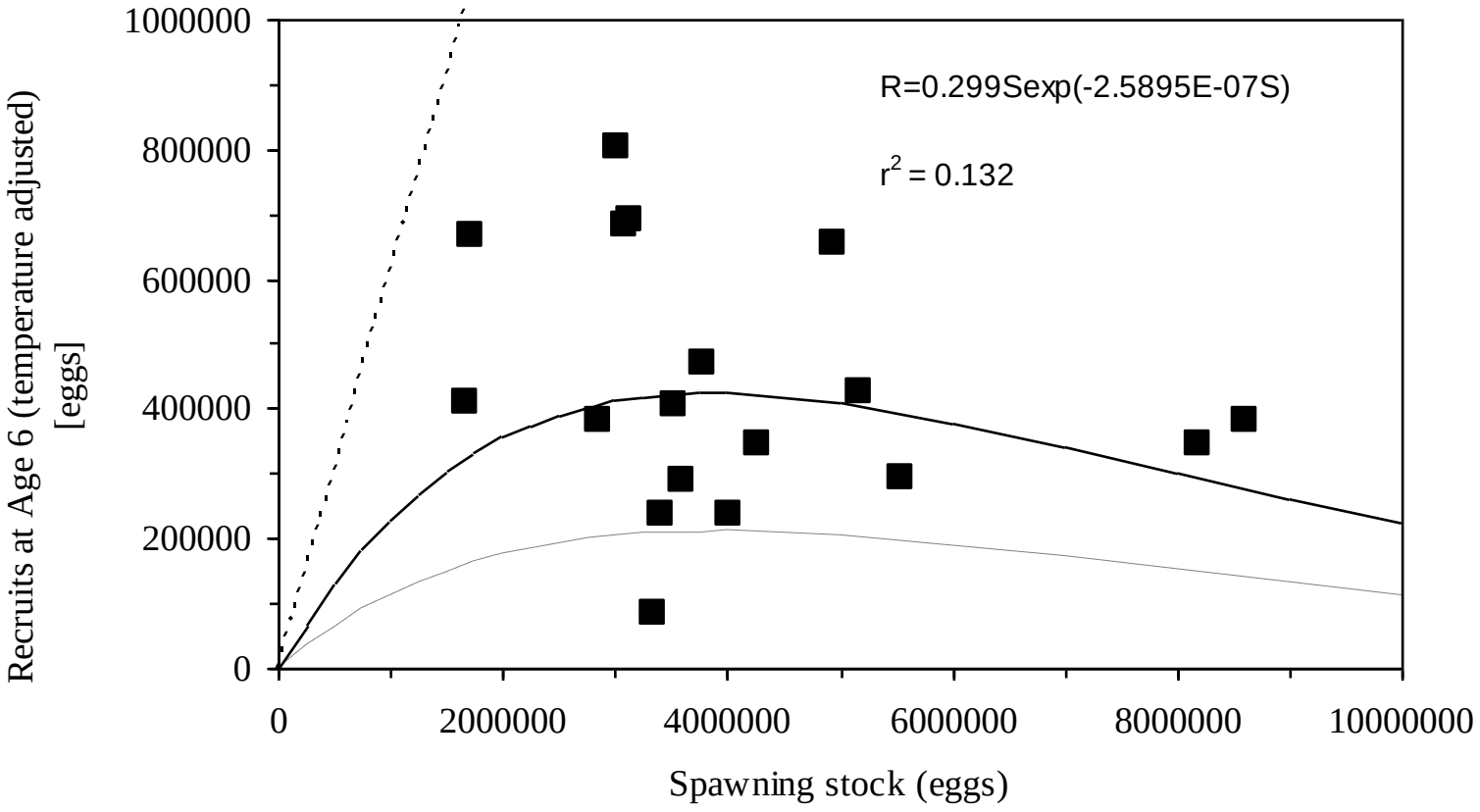
(Trancart *et al.*, 2014).

Population Dynamics

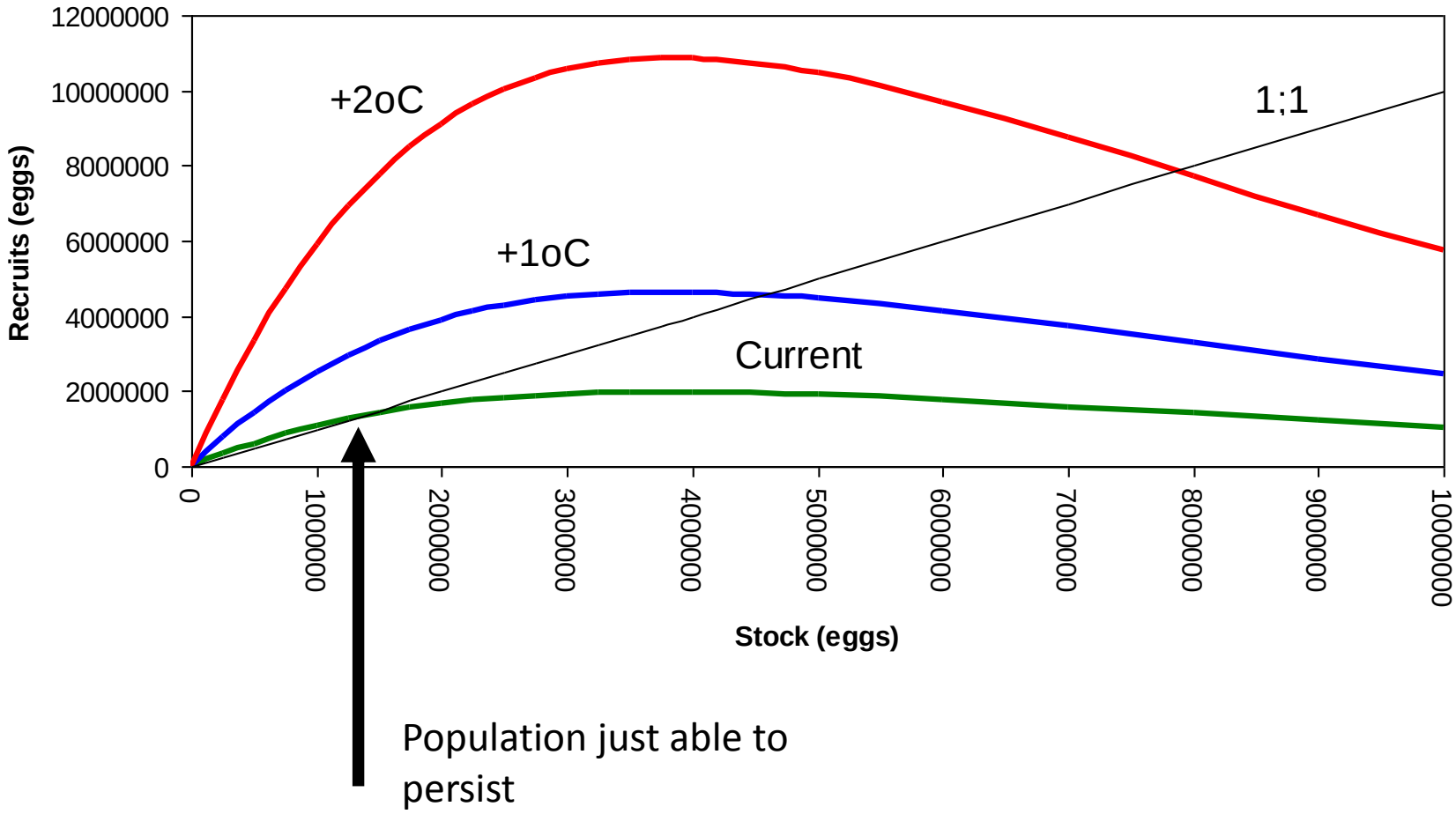
YCS in relation to mean June-August temperature



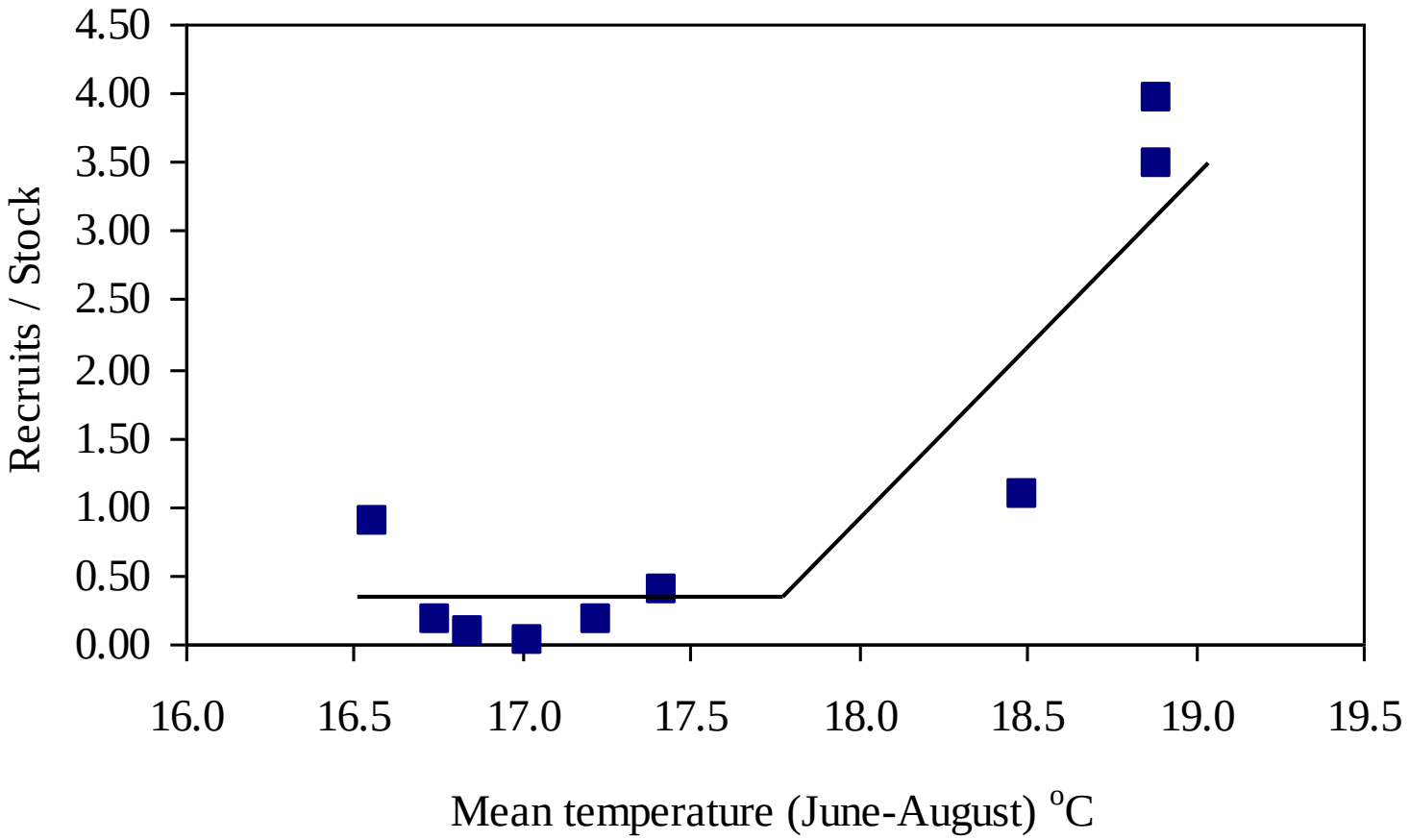
Stock recruitment relationship



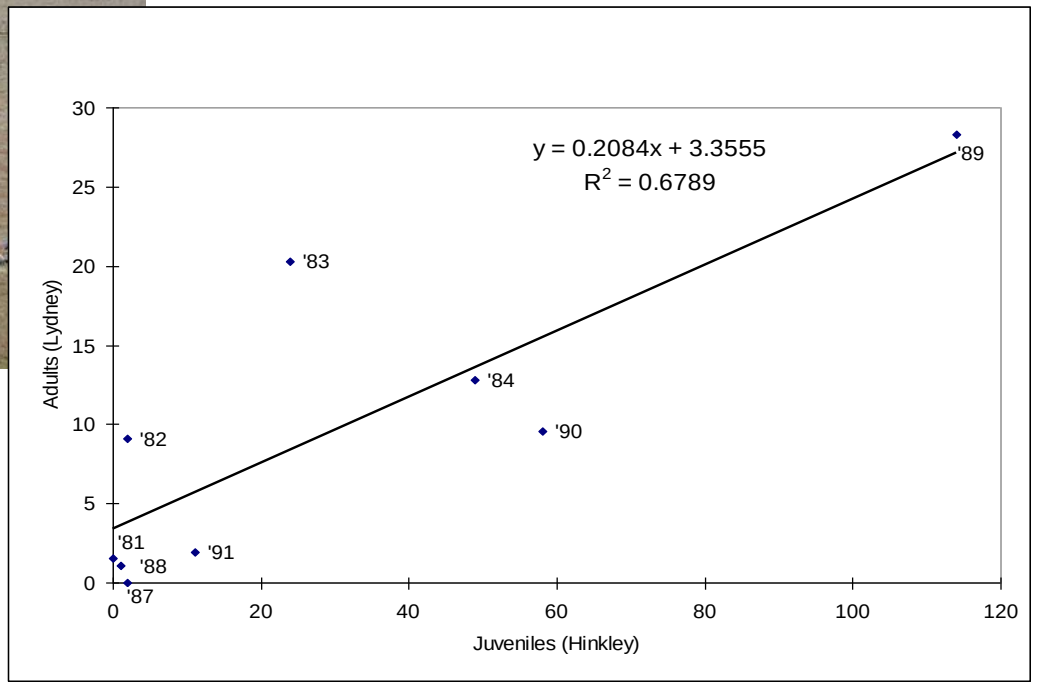
Influence of temperature on S/R relationship



Influence of temperature on recruitment



Monitoring.

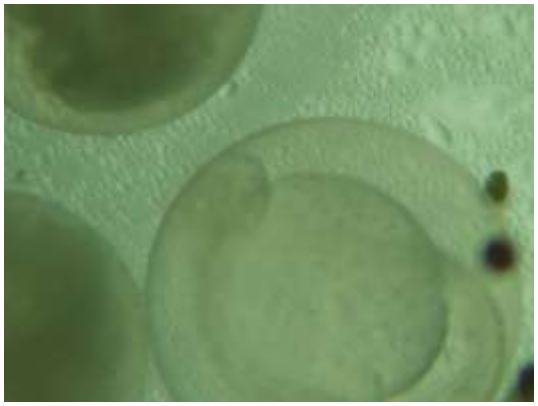

y = 0.2084x + 3.3555
R2 = 0.6789
Adults (Lydney)
Juveniles (Hinkley)
0
5
10
15
20
25
30
0
20
40
60
80
100
120
'81
'82
'83
'84
'87
'88
'89
'90
'91

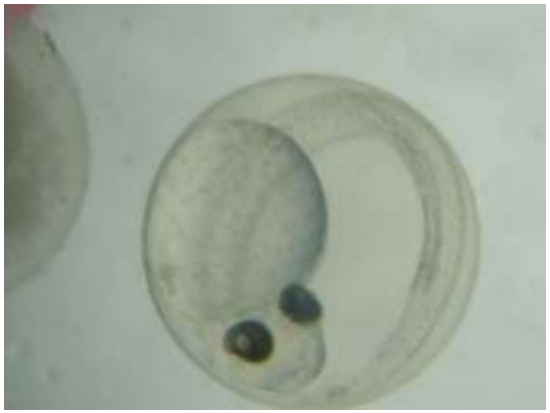
Sampling for adult migrating fish (April – June)

- Artisanal netsmen
- Drift netting
- Angling
- Evidence at spawning locations
- Attributes of spawning locations

Egg sampling

- Provides information on distribution
- Not a quantitative indicator





Bongo netting for shad post-larvae:
R. Barrow, June & July 2010 - 12

Recommendations

1. Improve political and public awareness;
2. Effective coordination between administrative bodies, between different parts of the river basins, and between river, estuarine and marine jurisdictions;
3. Improve our system for collecting catch data from fishermen - they need to trust us;
4. Improve our understanding of habitat use and their biological requirements particularly during the marine stage;
5. Improve the efficiency of fishways;
6. Develop methodologies and collect data to calculate management targets and limits with coordination between conservation and fisheries objectives;
7. Assess the possibility of using these species in metrics of habitat continuity and/or quality.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