REMOTE SENSING in FISHERIES
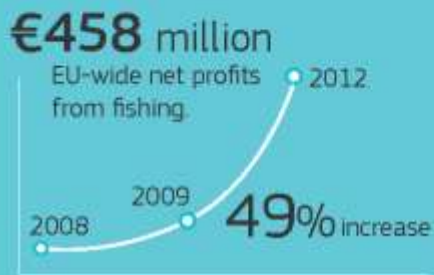
PROF. DR. HASAN HÜSEYİN ATAR

Direct Methods of Fish Detection

▶ The most direct and simple method of remote sensing in fisheries is visual fish spotting. Fishing fleets which exploit major fisheries such as tuna and menhaden are dependant on visual fish spotting from aircraft to direct their fleets.

EUROPEAN STOCKS

NORTH ATLANTIC, NORTH SEA AND BALTIC SEA

Number of stocks at MSY

27

2

2005   2014

94%   % of stocks overfished   41%

MEDITERRANEAN AND BLACK SEA

Number of stocks known

120
80
40
0

2007   2008   2009   2010   2011   2012
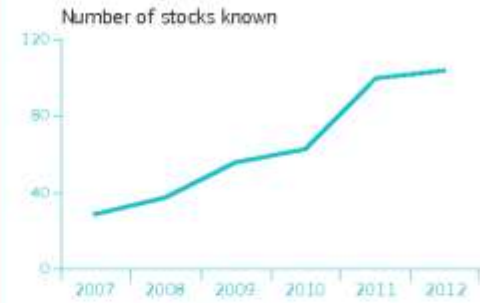
30 STOCKS analysed 2012

<MSY
>MSY 90–95%

Knowledge is improving, but state of STOCKS IS STILL WORRYING.

ECONOMIC REPORTS 2008-2012

€458 million
EU-wide net profits from fishing.
2012
2009
2008
49% increase

Large-scale fleets
Vessels over 12 metres
74% of total GVA
10% for distant-water fleets
Net profit
Small-scale fleets
under 12 metres
16% of total GVA

48% of jobs
Small-scale fleets

▶ Aerial photography per se is of little importance to the majority of commercial fisheries. The location of mobile fish schools, for example, cannot be provided fast enough to the fishermen. Aerial photography, however, can be of assistance to a fisheries scientist as it provides information about the distribution and relative abundance of pelagic fish, particularly the schooling species. The pattern of distribution and the location may identify the species observed, and the surface area of a school, measured from an aerial photograph, has been shown to be correlated with the biomass of some species.

- Echo-sounders and sonars have been in use as remote sensors for at least 50 years and are now widely used by the fishing fleets of the world. Sonars are useful for the detection of fish and biomass estimation.

- In recent years, high powered laser systems operating in the blue- green portion of the visible spectrum (lidar) have shown promise for the evaluation of fishery resources. A lidar carried on aircraft flying at an approximate altitude of 1700 m can detect fish at depths to 16 m.
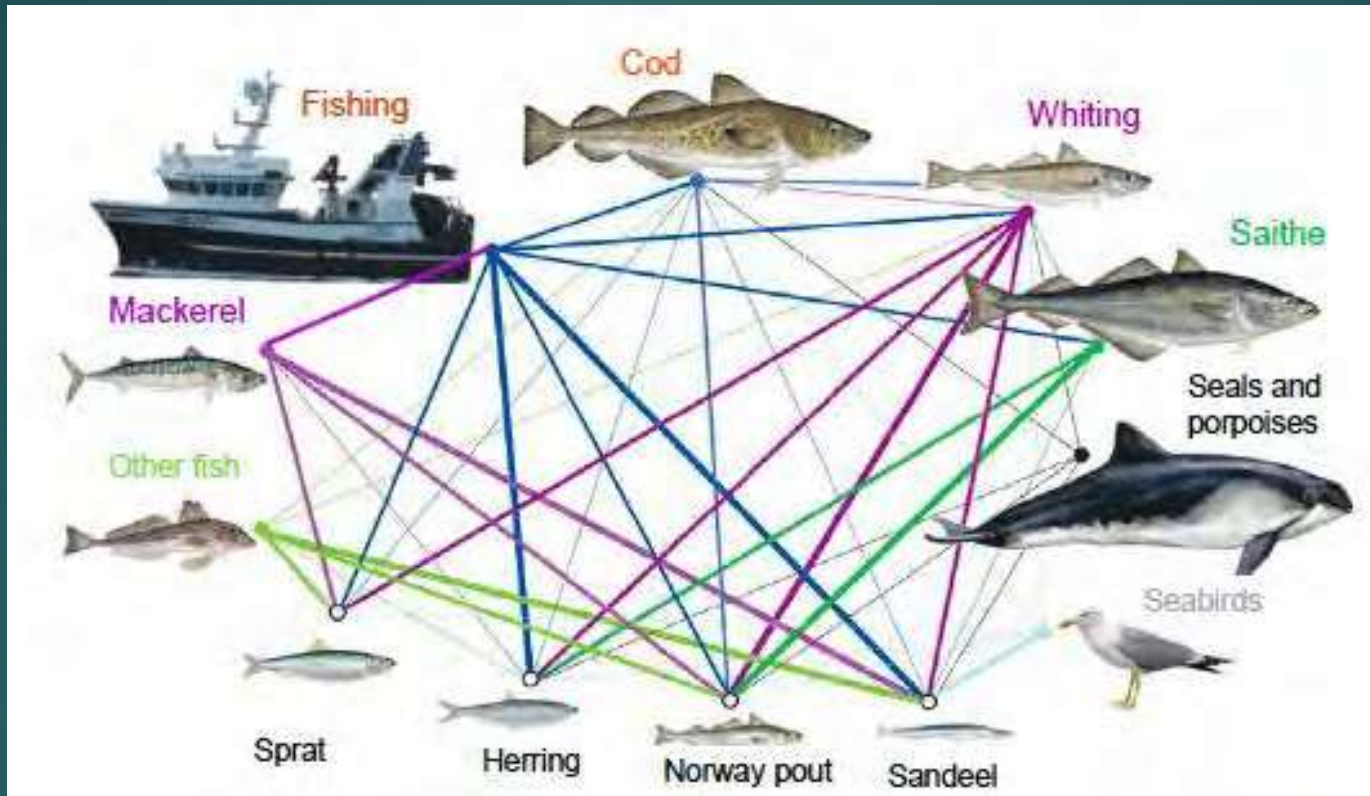
Indirect Methods of Fishery Assessment

▶ Estimation of a fishery resource can be assisted by the measurement of parameters which affect its distribution and abundance. Much of the research dealing with environmental effects related to fisheries are concerned with the correlation of a single parameter with the spatial and temporal distribution of fish. It is most likely, however, that fish respond to the sum total of environmental factors. Thus, it becomes necessary to correlate a large number of parameters, obtained by remote sensing techniques, with fish distribution.

► The environmental parameters most commonly measured from airborne and spaceborne sensors are as follows: surface optical or bio-optical properties (diffuse attenuation coefficient, total suspended matter, yellow substance, chlorophyll pigments and macrophytes, commonly grouped under the general term of ocean colour); surface temperature; vertical and horizontal circulation features; salinity; oil pollution; and sea state.

SURFACE SUSPENDED SEDIMENT
CONCENTRATION MAP
CHIGNECTO BAY
MOD: JUNE 5, 1978

S.S.C. (mg/l)

3604 - 11,000
1187 - 3604
367 - 1187
126 - 367
41.3 - 126
13.6 - 41.3
4.44 - 13.6
1.45 - 4.44
<1.45

PECK POINT

RAGGED REEF POINT

NEW BRUNSWICK
STUDY AREA
NOVA SCOTIA