History of Fisheries Oceanography

1930: UW Oceanographic Laboratories founded and directed by TG Thompson (formalized in 1951)
1935: UW Board of Regents approves School of Fisheries under Acting Director WF Thompson.
Evolution of Definition

“…any kind of oceanography required for the appraisal or exploitation of any kind of organism useful to Man” (Blackburn quoted by Sette 1961)

No interest in cause, no explicit life history stage(s), **abundance for harvest**

“…is concerned with fluctuations in abundance of fisheries resources, the role of man in producing such fluctuations, and measures which can be taken to achieve and maintain optimum yields from these resources” (McHugh 1970)

No explicit life history stage(s), interest in variance, **optimum harvest**

NOAA: to better understand the influence of the environment on living marine resources in order to improve management.
Operational Fisheries Oceanography
- relationships of fisheries resources to the environment so fisheries can be prosecuted more effectively (e.g. predict availability of resources using oceanography)

Recruitment Fisheries Oceanography
- fluctuations in abundance of fishes, … through research on causes of variations in mortality of young stages (e.g. fluctuations in year-class strength)

Biological-Physical Fisheries Oceanography
- productivity of the ocean and its effect on fish stocks (e.g. decadal shifts in abundance at boundary currents)

Which one is the best predictor? Why?

Kendall & Duker 1998
Where does Fisheries Oceanography fit?

Focus of this class
Historical Timeline

T. Jefferson – declining fish stocks (1791)

S. Baird – 1st US Fish Commissioner (1871)

ICES 1902

CalCOFI 1937

PICES 1992

1800 1850 1900 1950 2000

WWI: the Great Fishing Experiment

Bigelow (NE)

Walford (E)

Thompson (NW)

Sette (SW)

Fishery Science Programs in ICES

Migration Committee (Committee A): initial hypothesis - fish species (herring, cod) undertook large-scale, annual migrations and that spatial and temporal variation in migrations affected local catch rates (i.e. understand fluctuations in landings due to movements)

Overfishing Committee (Committee B): TOR – overfishing and destruction of immature fish. Research program focused on a) catch statistics, b) quantitative egg surveys, c) research vessel trawl surveys, d) mark recapture program (i.e. understand fluctuations in landings due to mortality)

Baltic Sea Committee : Euro-centric, economically important
cf. Smith 1994
First Dedicated Acoustic Survey

Runnstrøm (1937)

- herring surveys in Norway
Marine Fish & Invertebrate Landings

Jennings et al. 2001
Marine Fish & Invertebrate Landings

Towards sustainability in world fisheries (Nature 418: 689-695)

IUU – illegal, unreported, unregulated

Pauly et al. 2002
Increasing Role of Aquaculture

FAO 2012
# World Fisheries Production and Utilization

<table>
<thead>
<tr>
<th>PRODUCTION</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tbody>
<tr>
<td>Capture</td>
<td></td>
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<tr>
<td>Inland</td>
<td>9.8</td>
<td>10.0</td>
<td>10.2</td>
<td>10.4</td>
<td>11.2</td>
<td>11.5</td>
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<tr>
<td>Marine</td>
<td>80.2</td>
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<td>79.5</td>
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<tr>
<td>Total capture</td>
<td>90.0</td>
<td>90.3</td>
<td>89.7</td>
<td>89.6</td>
<td>88.6</td>
<td>90.4</td>
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<tr>
<td>Aquaculture</td>
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<tr>
<td>Inland</td>
<td>31.3</td>
<td>33.4</td>
<td>36.0</td>
<td>38.1</td>
<td>41.7</td>
<td>44.3</td>
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<tr>
<td>Marine</td>
<td>16.0</td>
<td>16.6</td>
<td>16.9</td>
<td>17.6</td>
<td>18.1</td>
<td>19.3</td>
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<tr>
<td>Total aquaculture</td>
<td>47.3</td>
<td>49.9</td>
<td>52.9</td>
<td>55.7</td>
<td>59.9</td>
<td>63.6</td>
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<tr>
<td>TOTAL WORLD FISHERIES</td>
<td>137.3</td>
<td>140.2</td>
<td>142.6</td>
<td>145.3</td>
<td>148.5</td>
<td>154.0</td>
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</table>

<table>
<thead>
<tr>
<th>UTILIZATION</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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</thead>
<tbody>
<tr>
<td>Human consumption</td>
<td>114.3</td>
<td>117.3</td>
<td>119.7</td>
<td>123.6</td>
<td>128.3</td>
<td>130.8</td>
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<tr>
<td>Non-food uses</td>
<td>23.0</td>
<td>23.0</td>
<td>22.9</td>
<td>21.8</td>
<td>20.2</td>
<td>23.2</td>
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<tr>
<td>Population (billions)</td>
<td>6.6</td>
<td>6.7</td>
<td>6.7</td>
<td>6.8</td>
<td>6.9</td>
<td>7.0</td>
</tr>
<tr>
<td>Per capita food fish supply (kg)</td>
<td>17.4</td>
<td>17.6</td>
<td>17.8</td>
<td>18.1</td>
<td>18.6</td>
<td>18.8</td>
</tr>
</tbody>
</table>

FAO 2012
Typical Fishery Trajectories

Jennings et al. 2001