Conservation and Ecology of the Freshwater Pearl Mussel

*Margaritifera margaritifera* (L.)

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STRUCTURE

- Background
- Conservation status
- Life History
- Habitat requirements
- Threats
- Projects
- Summary
Natural distributions of pearl mussels (Unionoida: Margaritiferidae).
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River Kerry age structure

a) Main stem

b) tributary

n = 1140

n = 621
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The freshwater pearl mussel life cycle.

- **ATTACHMENT**
  - Fish release glochidia on gills of salmonid host.

- **ENCYSTMENT**
  - Glochidia overwinter on gills of salmonid host.

- **RELEASE**
  - 2-3 x 10^6 glochidia released from female during mid-late summer (mortality >99.99%).

- **SETTLEMENT**
  - Mussel seed (~0.4mm) drop off host gills in spring/early summer.

- **FERTILISATION**
  - Fertilised eggs develop within female.

- **MATURATION**
  - 12-20 years.

- **ADULT MUSSEL (6.5-15cm)**
  - Mature from ~12-80 years.

- **JUVENILES (<6.5cm)**
  - Bury into river bed sediments.
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Macro-habitat features

a) Presence/absence

b) Optimal habitat
THREATS

- Pearl fishing
- Pollution (industrial/agricultural)
- Loss of habitat
THREATS

- Pearl fishing
- Pollution (industrial/agricultural)
- Loss of habitat

- Decline of host fish stocks
- Climate change
The graph shows the catch (x 1000) and extinctions of Salmon, Trout, and Mussels from 1950 to 2000. The catch data is represented by line graphs, while the extinctions are shown by a dashed line. The catch of Salmon fluctuates significantly, reaching its peak in the 1970s. The Trout catch is less volatile but also shows a decrease over time. Mussels show a steady increase in extinctions from 1950 to 2000.
## Climate change scenarios for Scotland

<table>
<thead>
<tr>
<th>Year</th>
<th>Temp (°C)*</th>
<th>Precipitation (%)*</th>
<th>CO₂ (ppmv)*</th>
<th>Sea level (m)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>______</td>
<td>________</td>
<td>353</td>
<td>________</td>
</tr>
<tr>
<td>2020</td>
<td>+0.5 → +1.2</td>
<td>+3 → +6</td>
<td>415 → 434</td>
<td>________</td>
</tr>
<tr>
<td>2050</td>
<td>+0.8 → +2.0</td>
<td>+3 → +5</td>
<td>467 → 528</td>
<td>+0.1 → +0.7</td>
</tr>
</tbody>
</table>

* 30 year periods, with respect to 1961-1990 average (Hulme & Jenkins, 1998)

** Mean sea level rise projections (Dawson et al., 2001)
Glochidial release dates 1994-2002

\[ y = -0.40x + 75.21 \]
\[ r^2 = 0.528 \ (p < 0.05) \]
A. Pre-flood

B. Post-flood

Mussel density (No/m²)
- dry
- < 1
- 1 - 10
- 11 - 50
- 51 - 100
- > 100

Scale: 10 m
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SUMMARY

- Range
- 70-100% decline
- Recruitment
- Factors
- Conservation