The research area of three temperate species of Eel: European eel (Anguilla anguilla), American eel (Anguilla rostrata), and Japanese eel (Anguilla japonica) is in focus. Despite millions of years of adaptation, the three eel species have undergone a dramatic decline in only a few years. The beginning of the eel decline is difficult to identify because of the complex life cycles of the species and their long-life expectancy. Identifying the main drivers of the eel decline is still in debate. In this context, the key question is: What is the current conservation status of the three main species of Eel? To answer this question, we conducted a systematic literature review followed by an assessment of the main drivers of eel populations decline, the most critical phase of Eels life-cycle and the common vs species-specific features for action.

**Goals:**

European eel (Anguilla anguilla), American eel (Anguilla rostrata) and Japanese eel (Anguilla japonica) are three temperate catadromous species that share many remarkable ecological features. Despite millions of years of adaptation, the three eel species have undergone a dramatic decline in only a few years. The beginning of the eel decline is very difficult to identify because of the complex life cycles of the species and their long-life expectancy. Identifying the main drivers of the eel decline is still in debate. In this context, the key question is: What is the current conservation status of the three main species of Eel? To answer this question, we conducted a systematic literature review followed by an assessment of the main drivers of eel populations decline, the most critical phase of Eels life-cycle and the common vs species-specific features for action.

**Methods & Results:**

**SYSTEMATIC REVIEW**

- Searching the literature
  - Used a search string to conduct searches in Web of Science and Scopus aggregator databases.
  - Timeframe restricted to the past 12 years (2008-2020).

<table>
<thead>
<tr>
<th>Keywords</th>
<th>N° Articles found without duplicates (WoS + Scopus)</th>
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<tbody>
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<td>European eel</td>
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</tr>
<tr>
<td>American eel</td>
<td>3877</td>
</tr>
<tr>
<td>Japanese eel</td>
<td>992</td>
</tr>
</tbody>
</table>

**Selecting Studies and Assessing Relevance**

- Inclusion and exclusion criteria were established.
- Titles and abstracts were screened for relevance according to a proper inclusion criteria and full text reviews were subsequently conducted to select relevant articles based on inclusion and exclusion criteria.

**Data Mining, Analyses, and Synthesis**

**CONSERVATION ACTIONS - STATUS**

- Difficulties in the implementation of the Eel Management Plan in Europe.
- International coordination has not yet started for the American eel.
- The East Asia Eel Resource Consortium does not yet have any official support, and the first attempt at international coordination took place in 2014 between South Korea, China, Taiwan and Japan with an agreement on the amount of glass eel that can be used for aquaculture.

**EELS' LIFE CYCLE & THREATS**

- Climate Change
- Pollution
- Parasites
- Overfishing
- Habitat Degradation

**Figure 1. Life cycle of the three Anguilla species and effects of global change components, adapted from Drouin et al., 2018.**

**Conclusions:**

In total, 2743 scientific papers referring to the “European Eel”, “American Eel” or “Japanese Eel” in the title, abstract or keywords were published since 2006 until the present, demonstrating the effort of the scientific community to increase knowledge about this species. The simultaneous decline of the three species strongly suggests the influence of large-scale factors. Robust quantitative historical data on eel and the anthropogenic pressures are lacking. The effects of fragmentation, global warming, fisheries and pollution have been documented for most of these species. More generally, most migratory animals regardless of taxa have undergone similar declines in the past, raising the question of sustainability of migratory tactics in the face of global change. As the eel is a panmictic species with a single common spawning stock for the entire distribution range, the lack of a meta-population structure means that there is a real threat of extinction of the species. When aiming for the conservation and recovery of a threatened species, it is imperative that the actions applied are effective. To that end, the efficiency and relative merit of different conservation actions need to be continually evaluated, using evidence from various approaches.

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**References:**