Sea Lamprey Monitoring and Conservation Status Assessment: An Irish Perspective

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Overview of Presentation

- Current Conservation Designations and Status.
- Outline of Irish Monitoring Programme
 - Redd count surveys (hotspots)
 - Float-over surveys (redd counts & spawning habitat)
 - Walkover surveys (redd counts & spawning habitat
 - Larval lamprey electro-fishing surveys (catchment-wide & index sites)
 - eDNA surveys
- Barrier Mitigation





Article 17 Reporting (6-yr cycle)

- Range, population size, habitat and future prospects for the species.
- Short-term trend: 12-year period (2 reporting periods).
- Long-term trend: 24-year period (4 reporting periods)
- Trend direction Stable / Increasing / Decreasing / Uncertain / Unknown.
- Arrive at a Conservation Status Assessment.
- Overall Trend in Conservation Status Improving / Deteriorating / Stable / Unknown.





Sea, River & Brook Lamprey SACs

- 14 designated lamprey SACs (12 sea lamprey, 11 river lamprey, 9 brook lamprey).
- Mostly substantial rivers with large catchments containing spawning and nursery habitats.
- Also comprise estuarine & tidal sections.
- Majority have manmade obstacles in their lower stretches, problematic for migrating species.
- Sea lamprey distribution in Ireland is not confined to SAC catchments.



Conservation Objectives for Irish SACs

Attribute	Measure	Target
Distribution	Percentage of river accessible	>75% of main stem length of rivers accessible from estuary
Annual run size	Number of sea lamprey redds	Annual run size should reflect that expected under near-natural conditions (JNCC 2015)
Larval lamprey in fine sediment	Larval lamprey/m ²	Larval lamprey present in SAC catchment
Extent & distribution of spawning and nursery habitat	m ² and occurrence	No decline in extent and distribution of spawning & nursery beds



JNCC (2015) Common Standards Monitoring Guidance for Freshwater Fauna, ISSN 1743-8160

EU Habitats Directive Status Assessment 2019

- Conservation Status (2007-2018) Bad (Stable)
- Assessment based on adult sea lamprey records.
- Range (9,500 km²) Bad
- Population Bad
- Habitat inadequate (access issues).
- Future prospects Bad
- Unfavourable all other Atlantic regions.
- Unknown UK



Juvenile Lake Feeding Sea Lamprey

- A number of Irish lakes since the 1950s.
- Historical reports & angler records
- 5 lakes (un-impeded access in 3 lakes).
- Reported January September.
- Brown trout, pike, bream & roach.
- Size range 140mm 410mm.
- No records of spawning 'dwarf' sea lamprey.







King, James J., and O'Gorman, Nicola. 2018 Initial observations on feeding juvenile sea lamprey (Petromyzon marinus L.) in Irish lakes. Biology and Environment: Proceedings of the Royal Irish Academy. DOI: 10.3318 BIOE.2018.09

Monitoring Sea Lamprey

- Redd count surveys (hotspots)
- Float-over surveys (redd counts & spawning habitat)
- Walkover surveys (redd counts & spawning habitat)
- Larval lamprey electro-fishing surveys (catchmentwide & index sites)











Redd Count Surveys (Hotspots)

- Many hotspots directly below weirs & some in the tidal freshwaters.
- Annual counts at hotspots extent of spawning & population trends.
- Repeat visits sometimes weekly.
- Spawning occurs from late May, peaking in early – mid June and mostly complete by end of June.
- Challenges too many redds to count, super / compound redds (usually when spawning occurs below weirs), accurate counts with repeat visits, high water levels, etc.





Survey123 Redd Count App

- Location, environmental, habitat and redd data.
- Repeat visits.
- Habitat data recorded on 1st visit.
- 'Rapid' & 'Comprehensive' Forms.
- Salmonid redd counts on 'rapid' form.
- How to incentivise interest in lamprey citizen science?





Annual Redd Counts for Hotspots

	Mulkear	Shannon	Owenogarney	Fergus	Suir	Nore	Nore	Barrow
	Annacotty	Plassey	Sixmilebridge	Ennis	Clonmel	Thomastown	Inistioge	St. Mullins
2014	>40	2	8	31	2	6		NA
2015	122	12	13	35	0	0		0
2016	111	12	4	29	0	0		5
2017	83	15	NA	16	0	5		2
2018	>76	10	NA	3	5	5		2
2019	>83	12	8	>7	NA	0		29
2020	>40	12	1	33	7	1	6	28
2021	>51	>?	10	41	1	0	9	58
2022	>80	7	4	45	9	0	0	98
2023	>80	6	11	45	22	7	0	23



Float-Over & Walkover Surveys





Float-Over & Walkover Surveys







Larval Lamprey Electro-Fishing Surveys

- Catchment based electrofishing survey.
- Sites pre-selected based on 1 site per 25km² of catchment.
- Accessibility.
- Broadly representative of topography and stream order across catchment.
- Electrofishing undertaken in 1m² of suitable nursery habitat.
- Standard survey protocol.
- Sea lamprey larvae rarely encountered.

















eDNA Studies - Mulkear & Munster Blackwater





Bracken, F.S., Rooney, S.M., Kelly-Quinn, M., King, J.J., & Carlsson, J. (2018). Identifying spawning sites and other critical habitat in lotic systems using eDNA "snapshots": A case study using the sea lamprey Petromyzon marinus L. Ecology and Evolution, 9, 553 – 567. doi: 10.1002/ece3.4777

Munster Blackwater eDNA Studies – Annual Variation





2017





Mulkear Catchment eDNA Studies – Annual Variation





Barrier Mitigation

- National Barriers Programme identify & prioritise structures for mitigation.
- Barrier assessments inventory.
- Barrier Mitigation Programme (2024 2027).
- Mitigation options removal, breaching, fish passage options, do nothing.
- Barrier Prioritisation Index.







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Total number

Acknowledgements

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Thank you for your attention – any questions?



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