



lascach Intíre Éireann
Inland Fisheries Ireland

Having to mitigate for lamprey – something you might not have reckoned on

James J. King, Inland Fisheries Ireland

jimmy.king@fisheriesireland.ie



**Chartered
Institute of
Ecology and
Environmental
Management**

**Irish Conference & AGM 2018
Making Mitigation Work
Red Cow Moran Hotel, Dublin**



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Lamprey

- 3 Species in Ireland
 - Brook Lamprey
 - River Lamprey
 - Sea lamprey

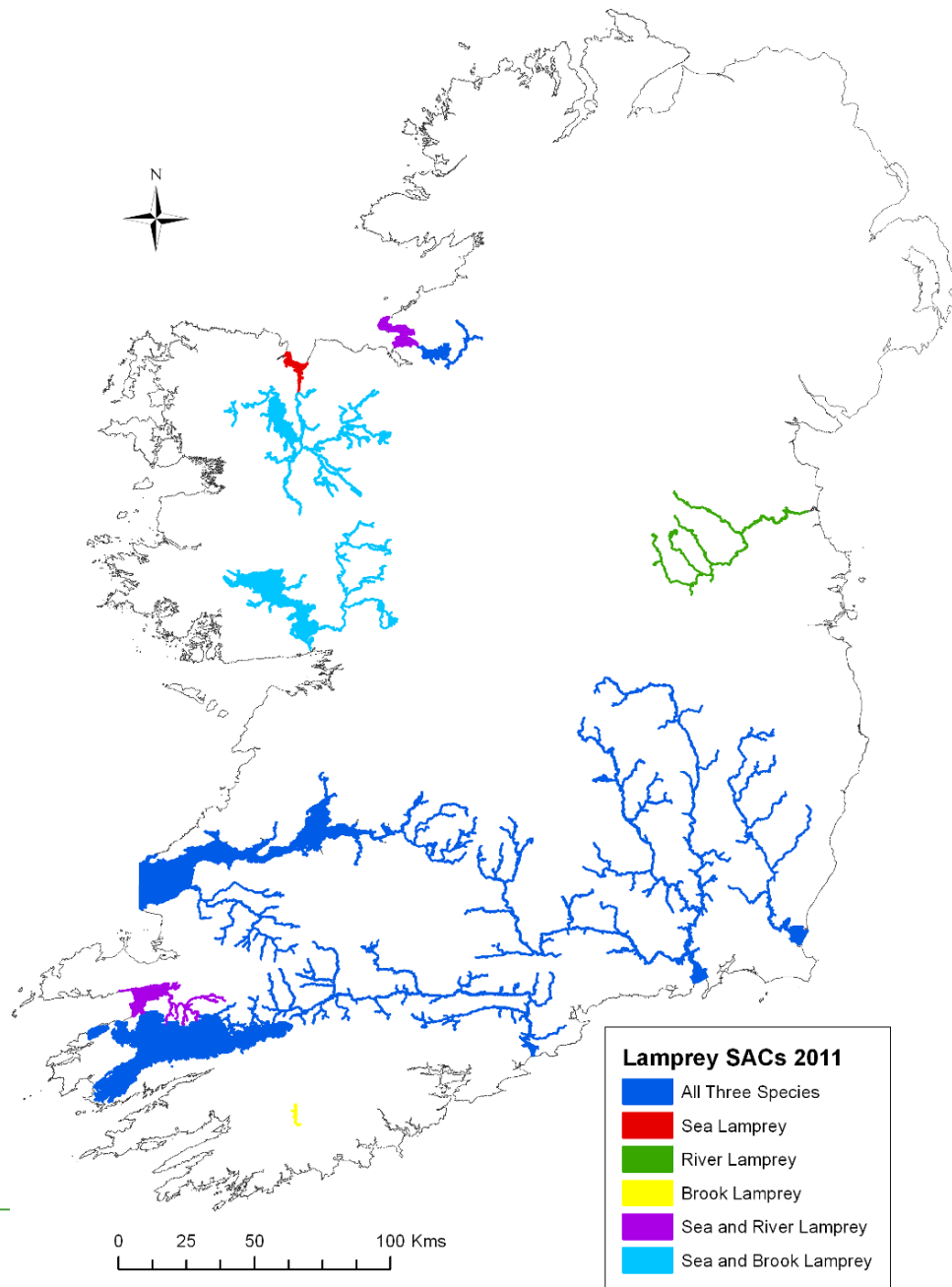
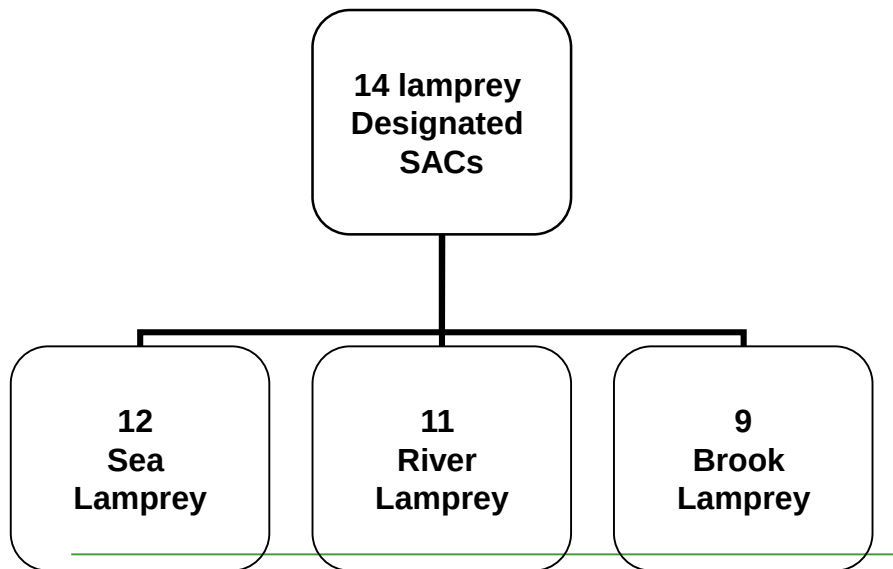


Why protect Lamprey?

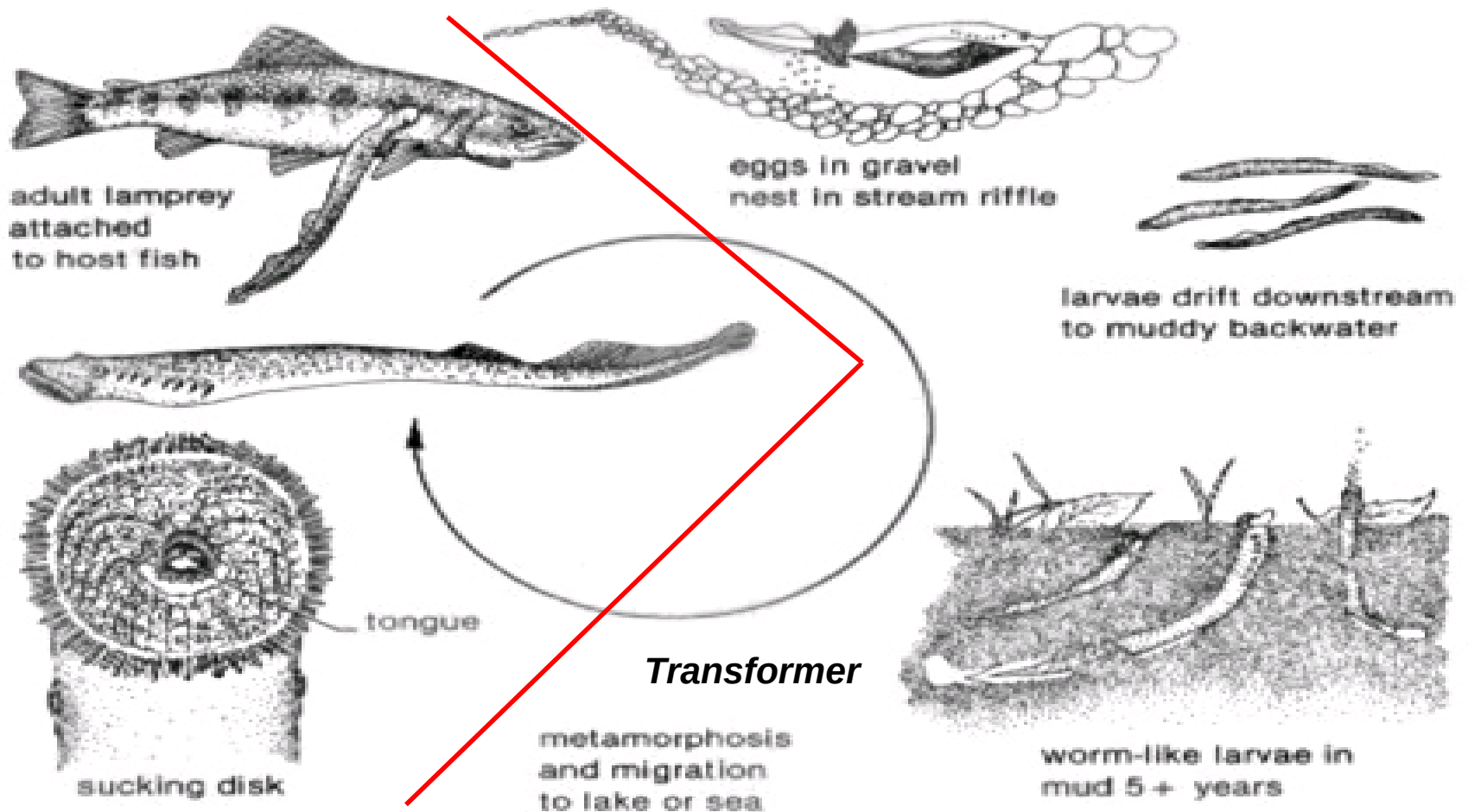
- All three lamprey species listed on Annex II of the Habitats Directive (92/43/EEC)
- Member states designate Special Areas of Conservation (SACs)
- Member states ensure favourable conservation status is maintained for target species.



Lamprey-designated SACs



Lamprey Life cycle



Adult

Juvenile

Lamprey habitats in freshwater

- Larval lamprey – fine sediment
- Adult spawning – gravels



Larval Lamprey Habitat



Larval lamprey – niche habitats



Sediment
accumulations
downstream of
vegetation



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Larval lamprey – niche habitats



Tree roots,
alcoves,
backwaters



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Lamprey Spawning Habitat

- Lamprey spawn on gravel riffles similar to trout and salmon



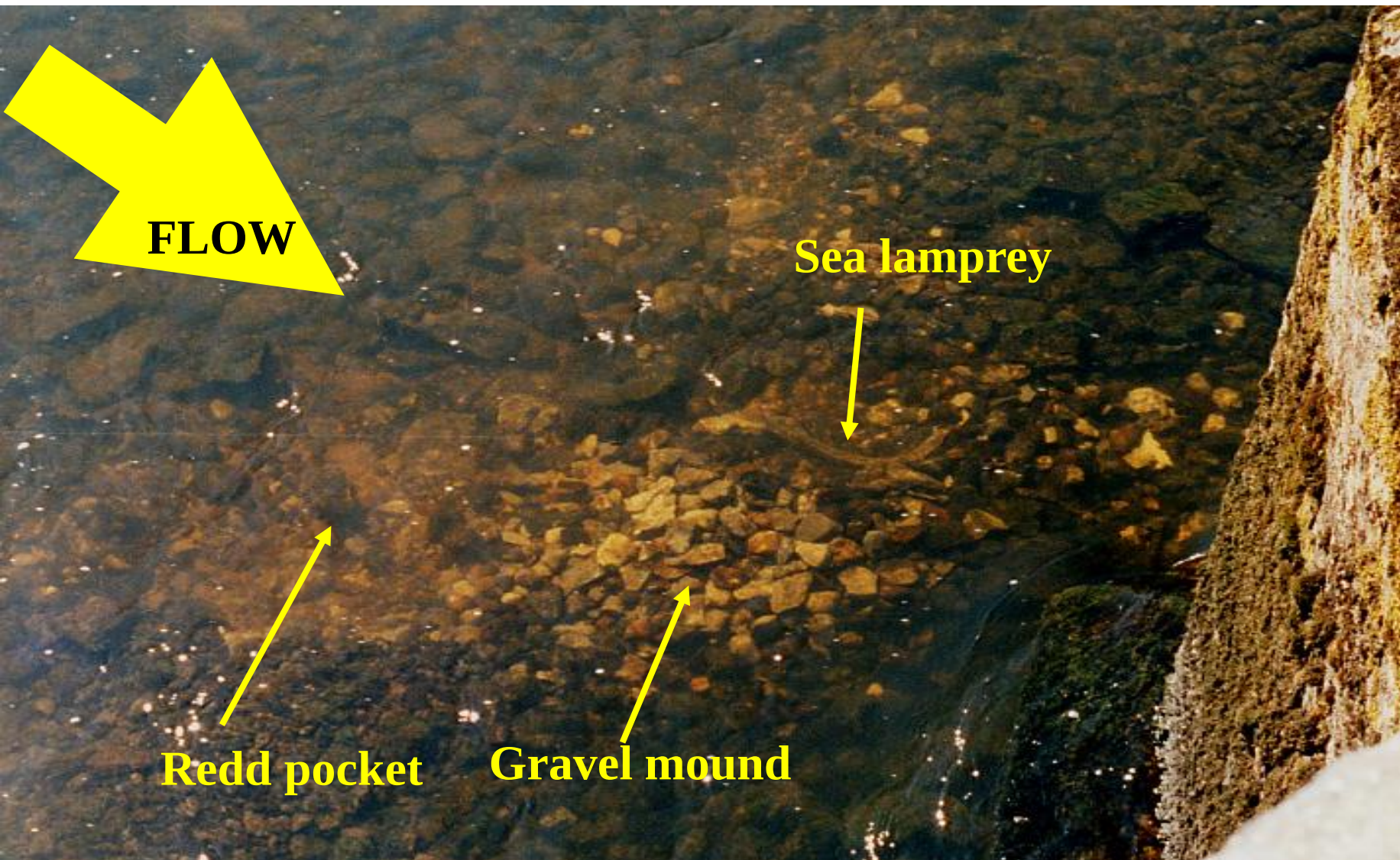
Brook lamprey spawning gravels and redds



Rooney, S.M., O' Gorman, N.M., Greene, F. and King, J.J. (2013) Aspects of brook lamprey (*Lampetra planeri* Bloch) spawning in Irish waters. *Biology and Environment : Proc. R. Ir. Acad.* 113B, 13-25

Sea Lamprey





Sea lamprey spawning

Sampling for larval lamprey



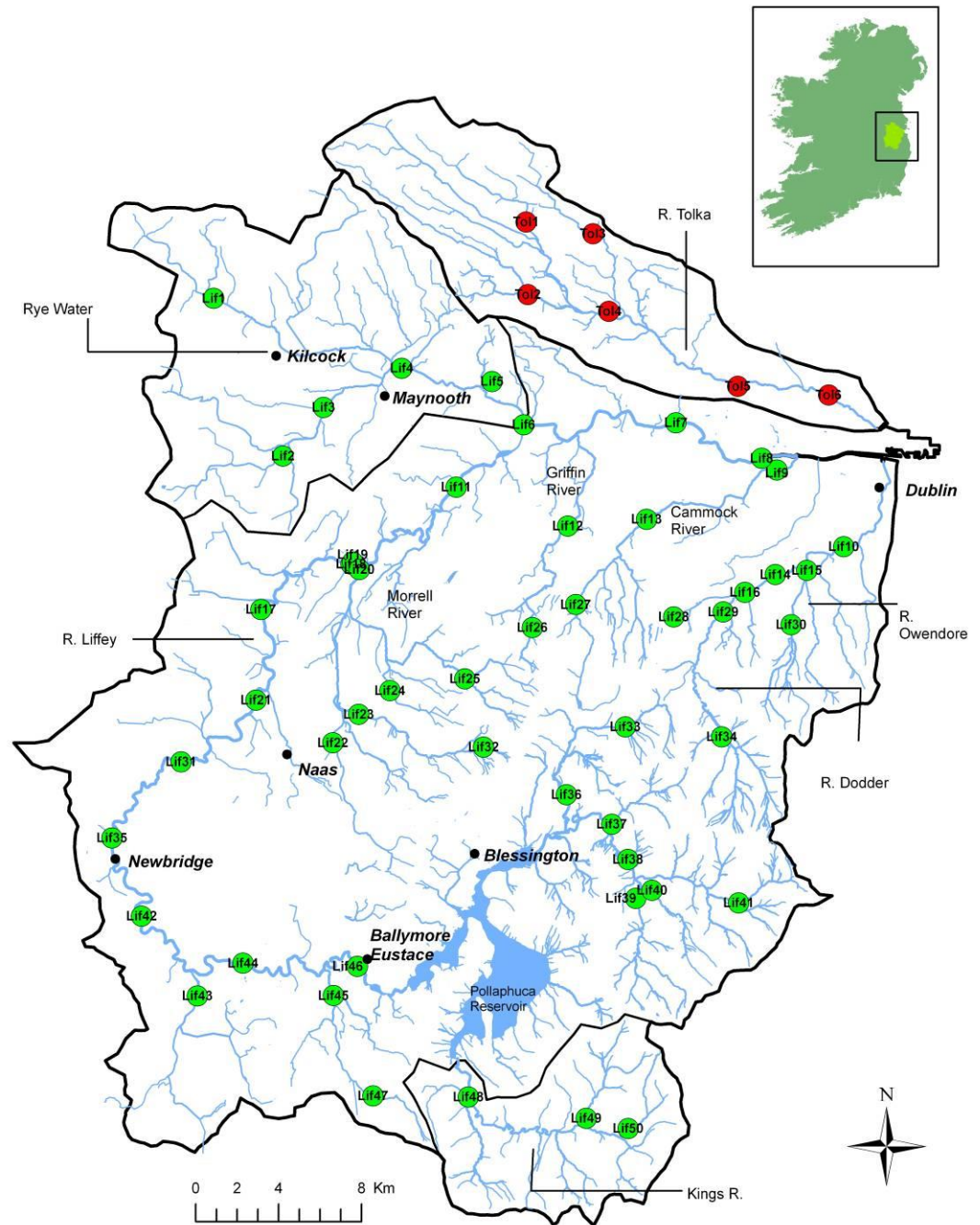
- Presence / absence
- Density
- Demographic structure

(Harvey & Cowx 2003)

Liffey catchment-wide larval survey

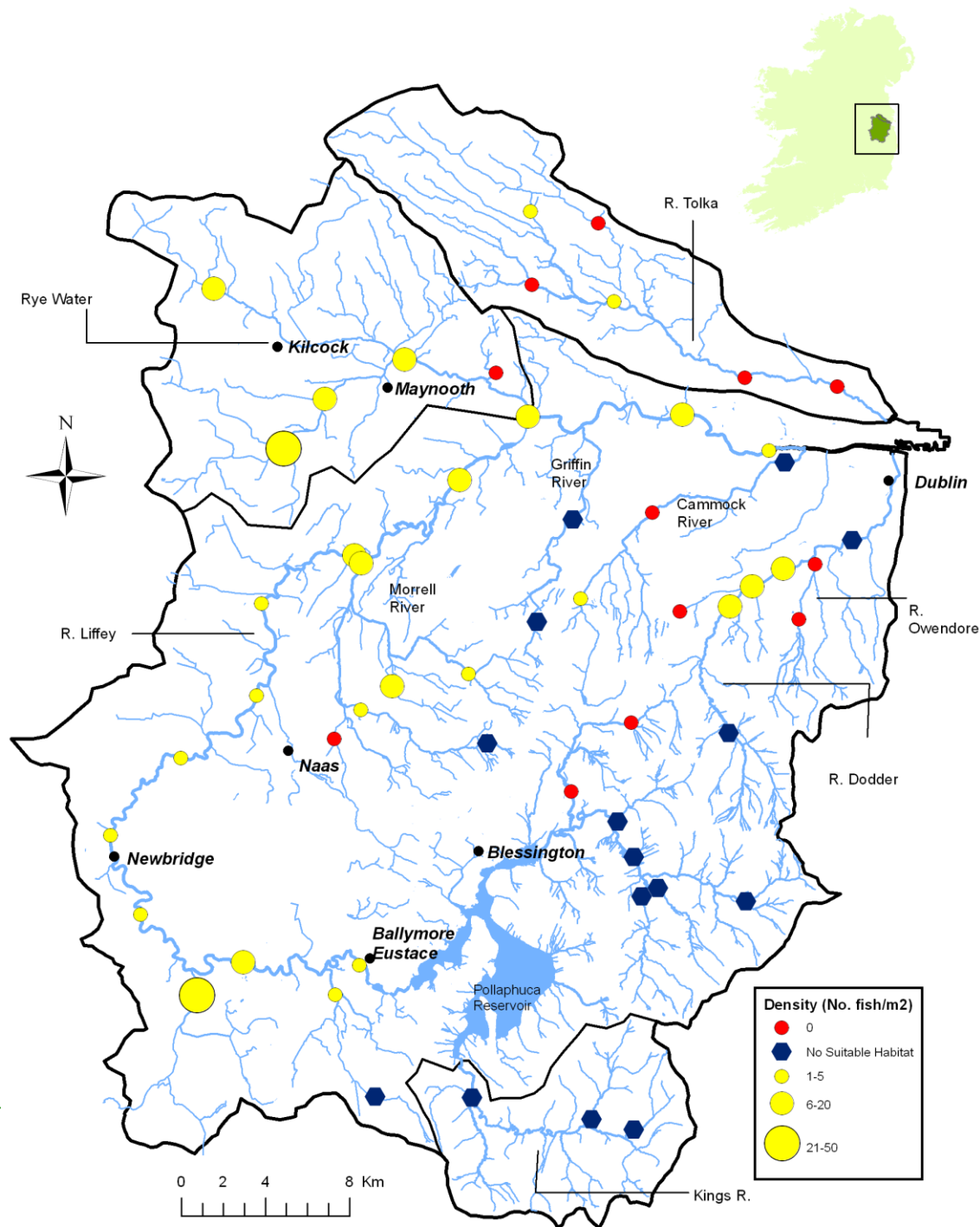


Proposed Sites Liffey-Tolka Catchment (desk study):



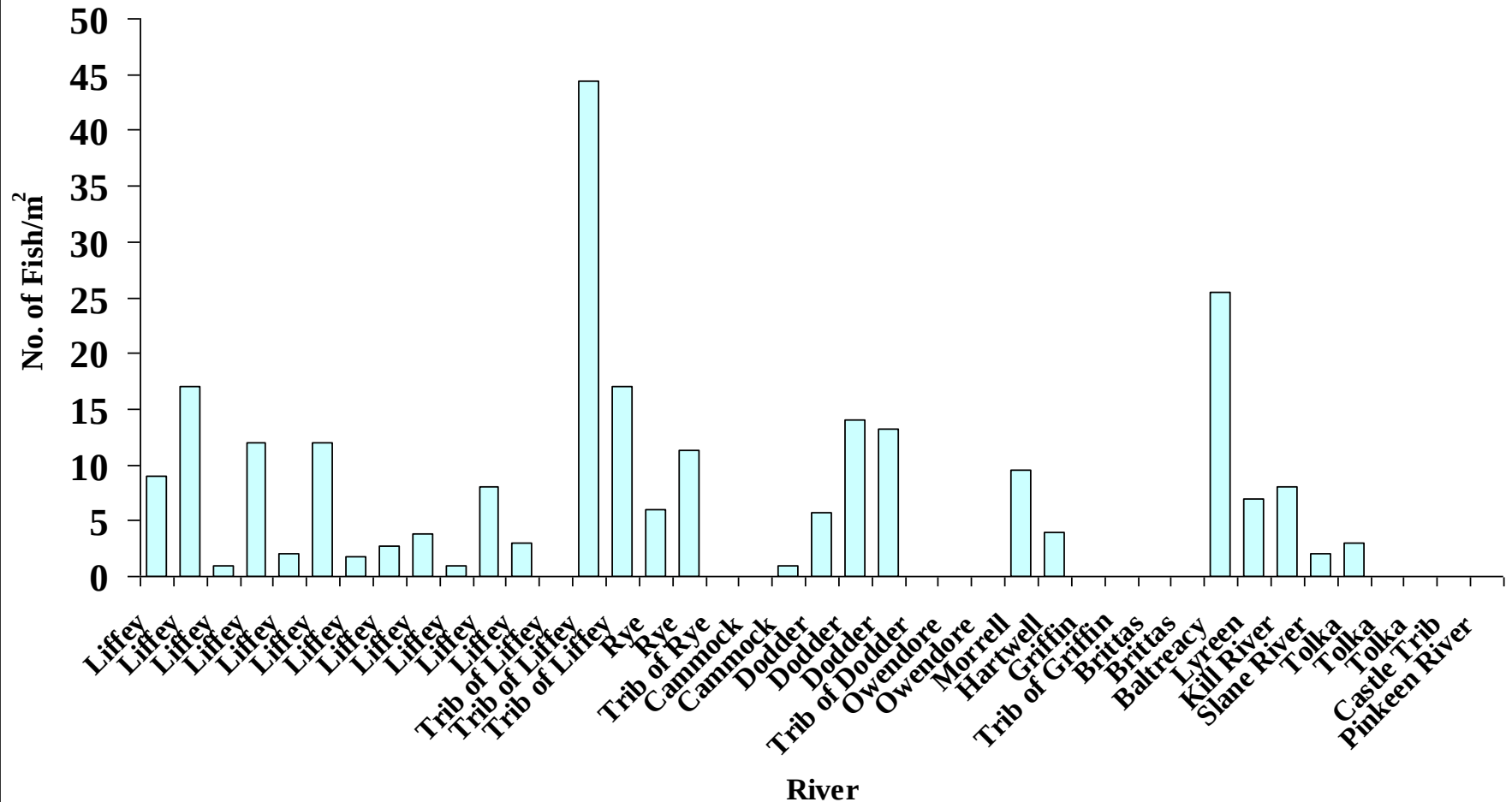
Presence / absence

- 56 Sites
- 15 sites – No suitable habitat
- 13 sites – Suitable habitat, no lamprey
- 28 sites – lamprey present



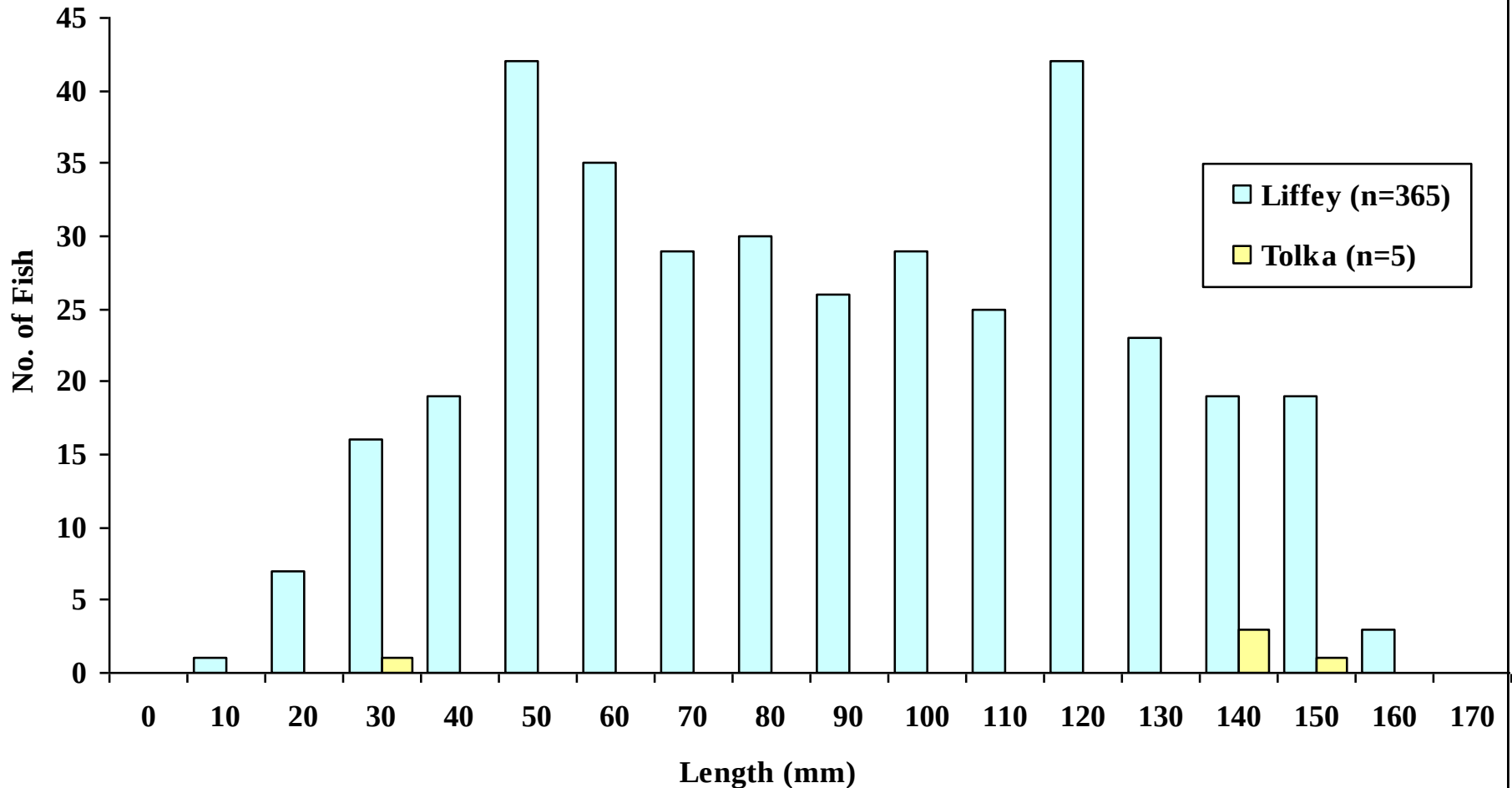
Density

Juvenile lamprey density (no/m²) at sites with suitable habitat on the Liffey Catchment (n=41)



Demographic structure

Liffey Catchment Length Frequency of juvenile lamprey
(n=370, no. of sites = 28)

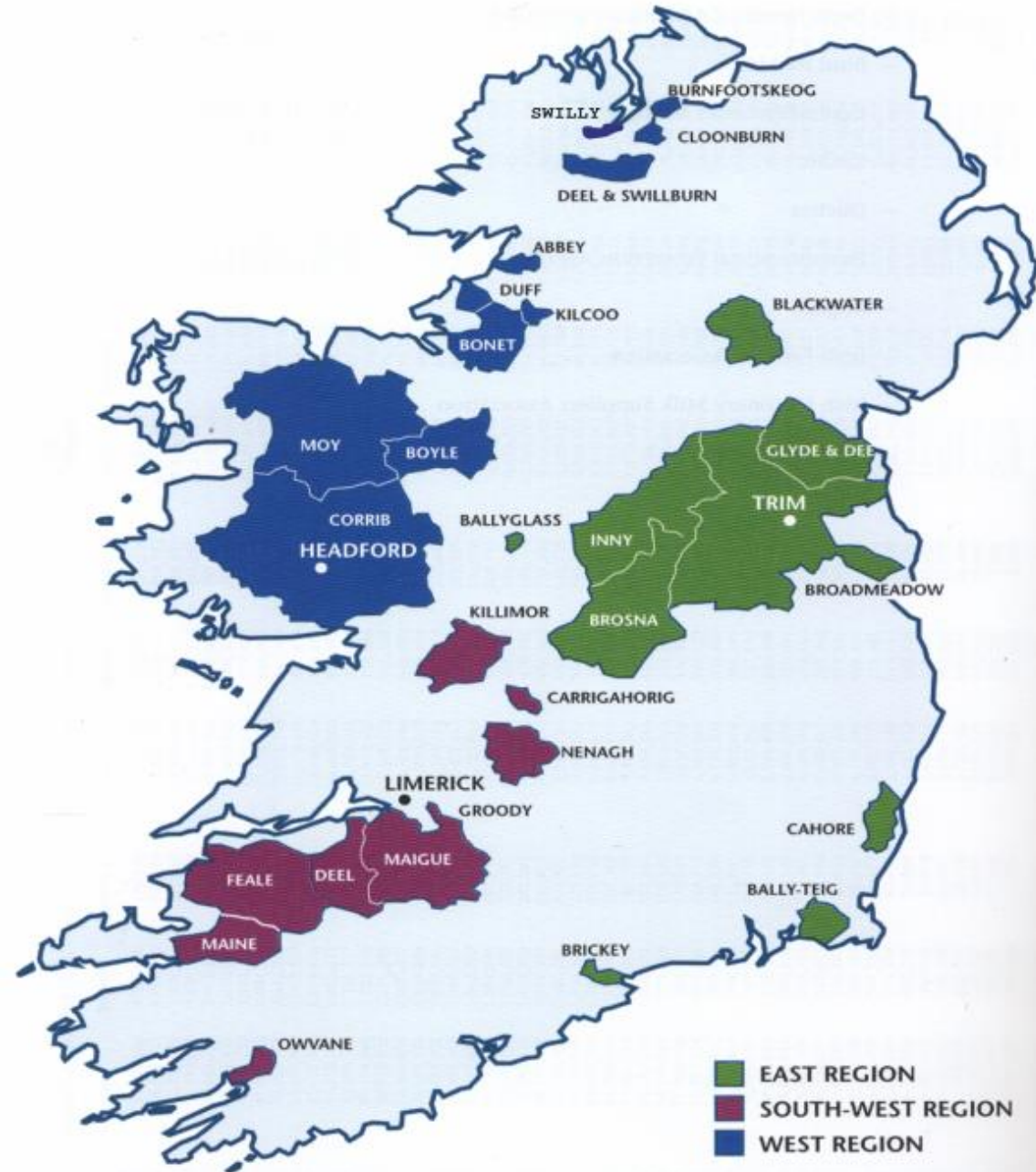


Channel engineering works and lamprey ammocoetes: impacts, recovery?



Engineering works: Potential Impacts of on lamprey, mitigation issues

- Loss of larval populations (fish kill??)
- Loss of larval habitat (fine sediments / niche locations)
- Loss of spawning adult fish (fish kill??)
- Loss of spawning habitat (gravel removal)



Office of Public Works
Arterial Drainage
network - 20% of
channels in Ireland

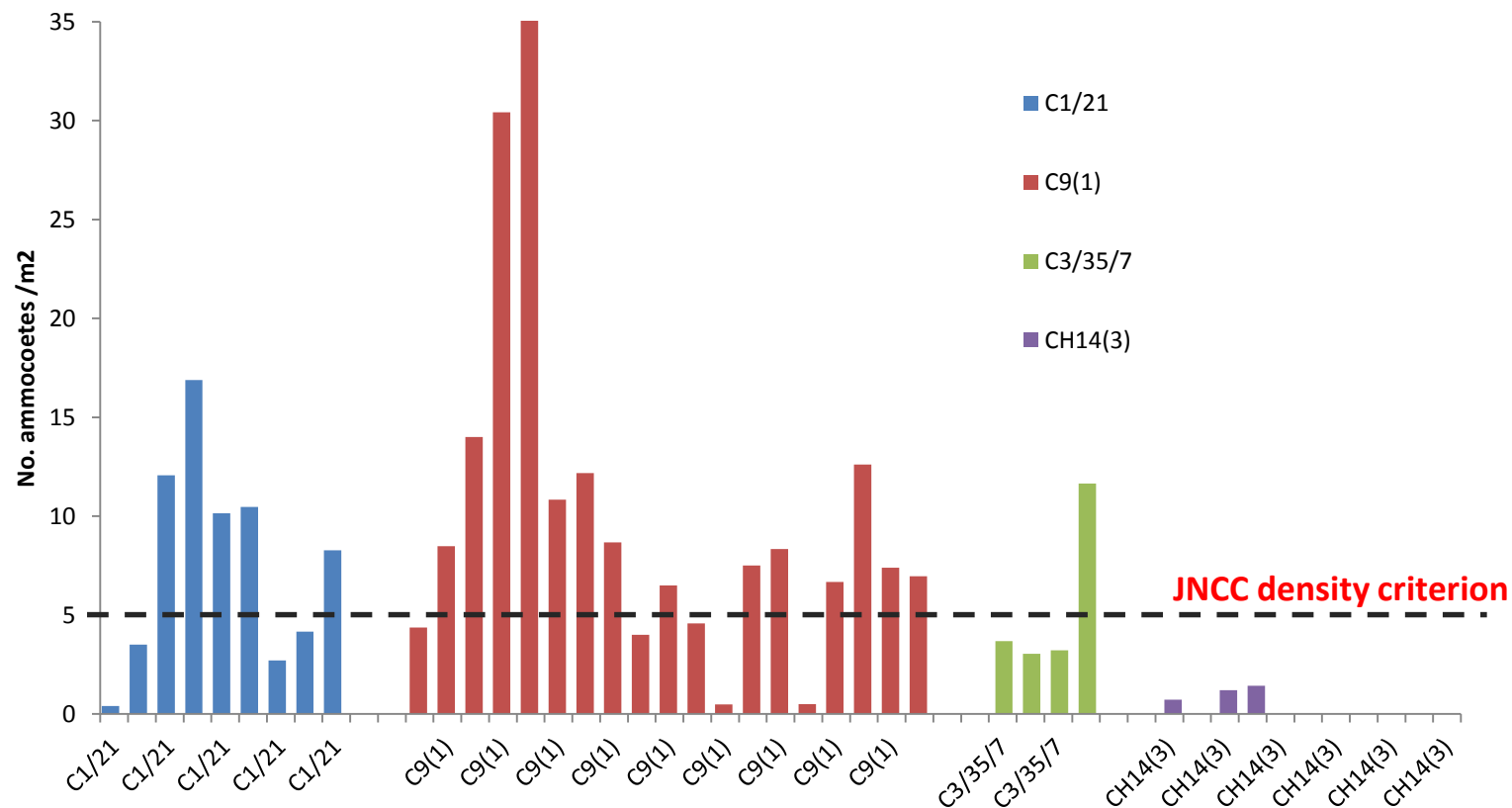
11,504 km of Channel
(90% <3m base width)

**2000km of channel
maintained annually**

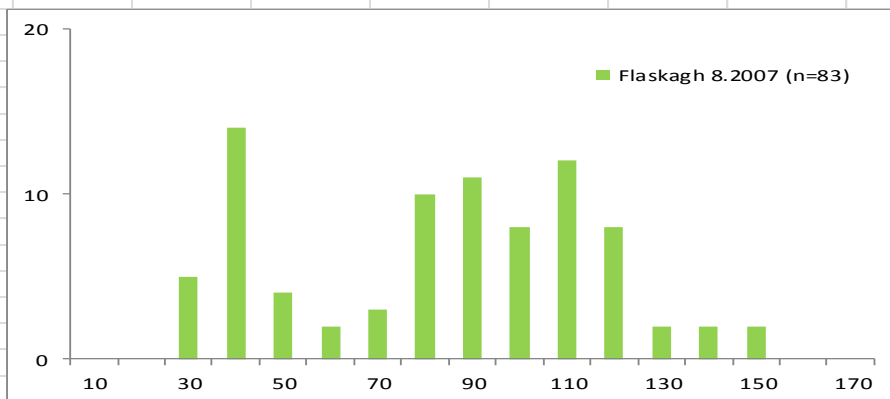
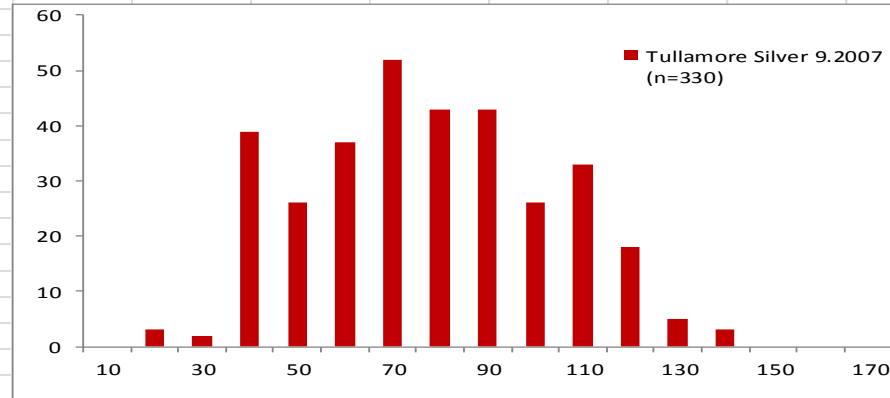
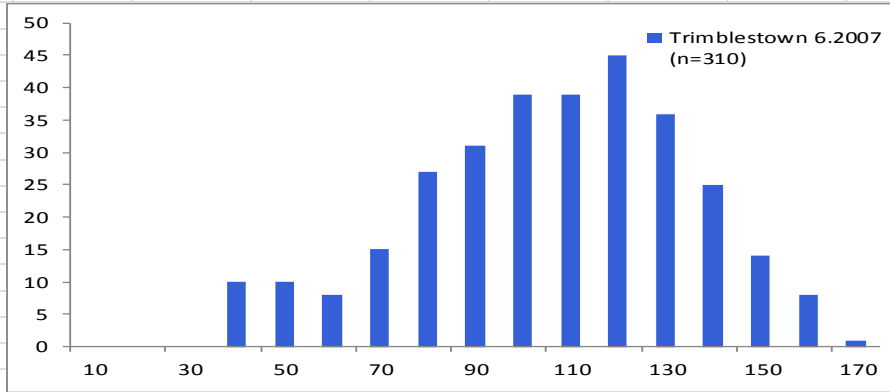
Quantifying channel cleaning impact on ammocoetes - Spoil Sampling



Quantitative ammocoete spoil sampling, 2007: Density



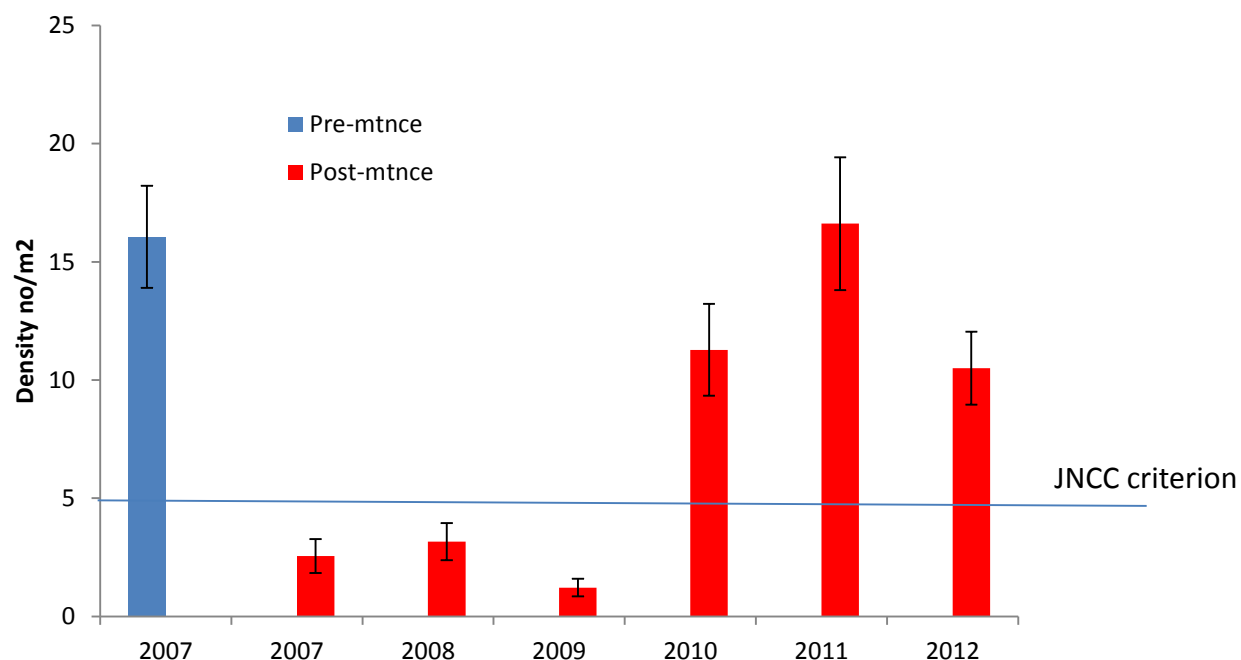
Quantitative ammocoete sampling in dredge spoil, 2007: Population structure



R. Stonyford study: Impact and recovery 2007 - 2012

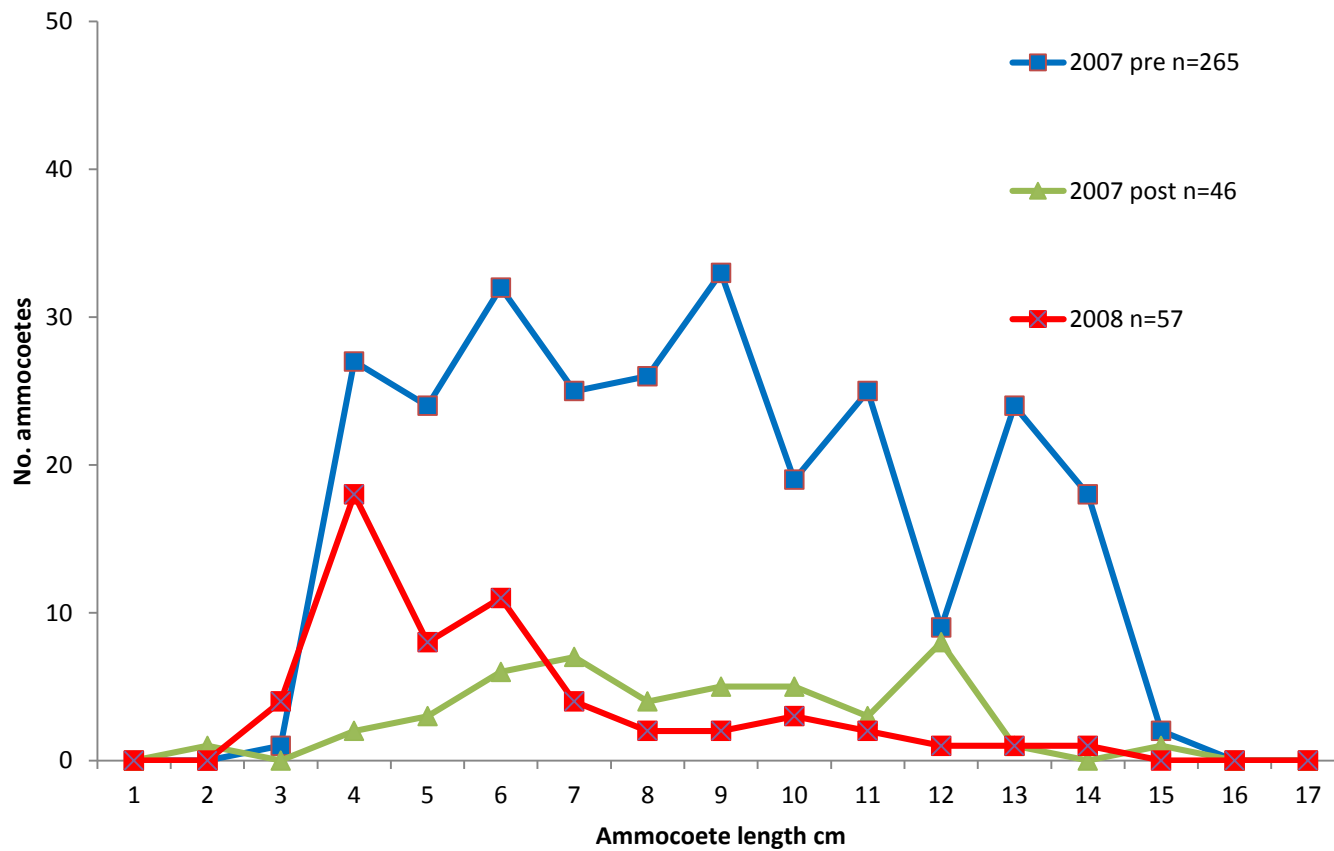


Mean density (with S.E.) from R. Stonyford prior to maintenance (2007) and in subsequent annual sampling events (n = 18 X 1m² replicates annually)



King, J.J., Wightman, G.D., Hanna, G. and Gilligan, N. (2015) River engineering works and lamprey ammocoetes; impacts, recovery, mitigation. *Water and Environment Journal*. 29, 482-488.

R. Stonyford study: : Length frequency 2007-08



R. Nore – Kilkenny City Flood Relief Scheme: Opportunity

- SAC for lamprey species
- Channel widening by 25% locally in 2002
- Creation of new shallow-water habitat
- Ammocoete survey of new habitats in 2005

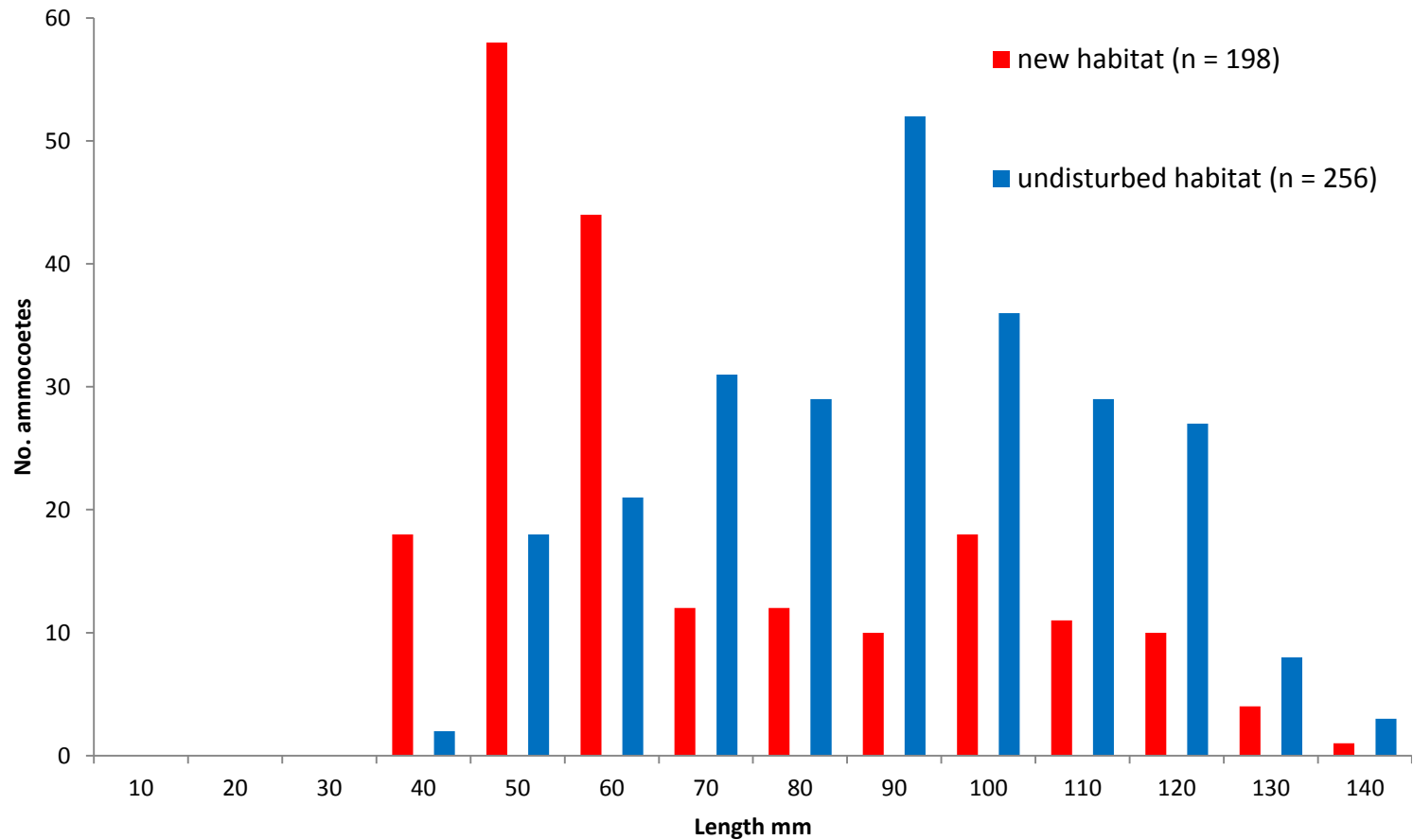


R. Nore: Ossory Meadow – new and undisturbed habitats 6.2005

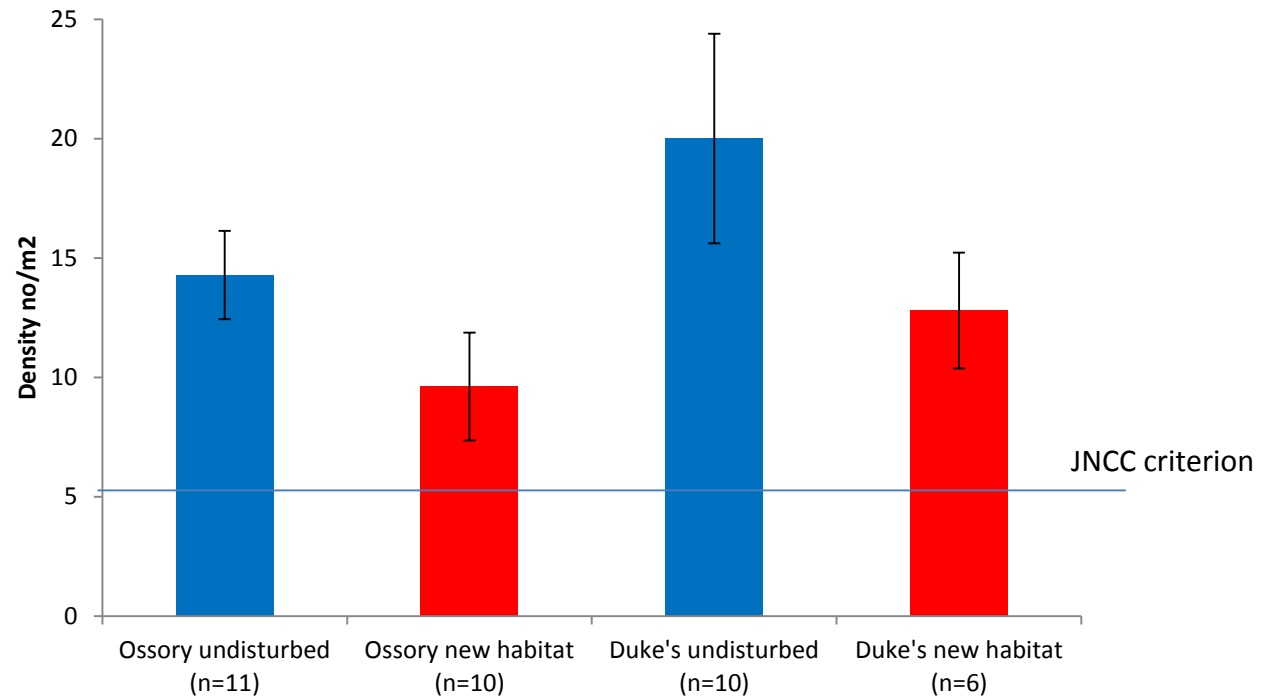


Kilkenny Flood Relief Scheme: Ossory Meadow – ammocoete length frequency

Channel widening = new habitat 2002 ; Survey 2005



Mean density (with S.E.) of ammocoetes from undisturbed and newly-created habitat, Kilkenny Flood Relief Scheme, 2005



Inherent Conflict

Channel conveyance management

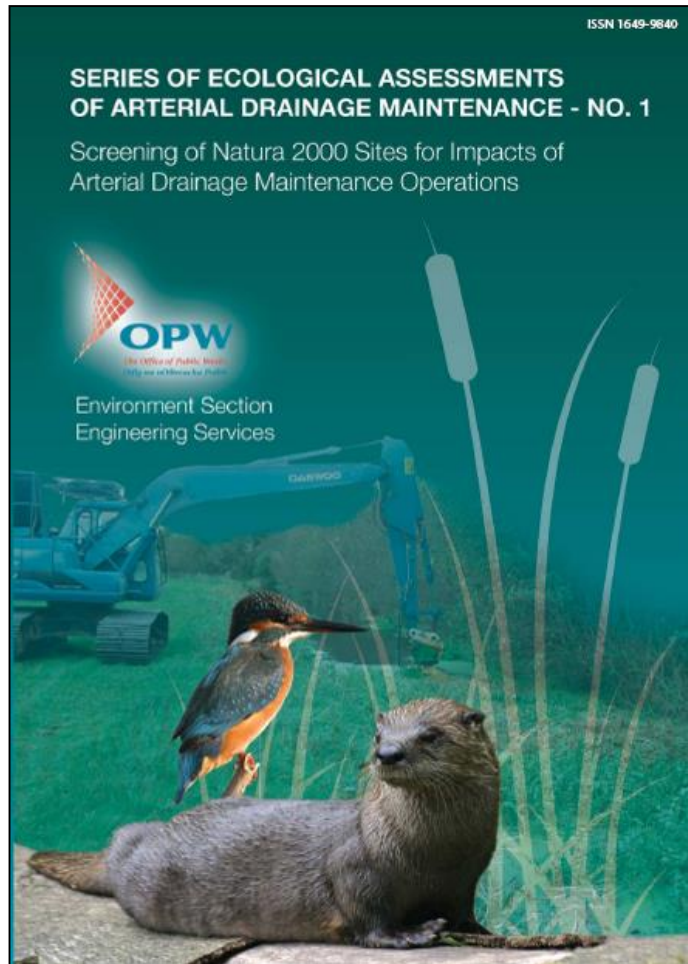
- Smoothing of flow routes
- Removal of channel roughness elements
- Uniform bed and side slopes

Ammocoete habitat conservation

- Need for low-velocity areas for sediment deposition
- Need for niche or alcove locations
- Retention of tree cover for roots and woody habitat

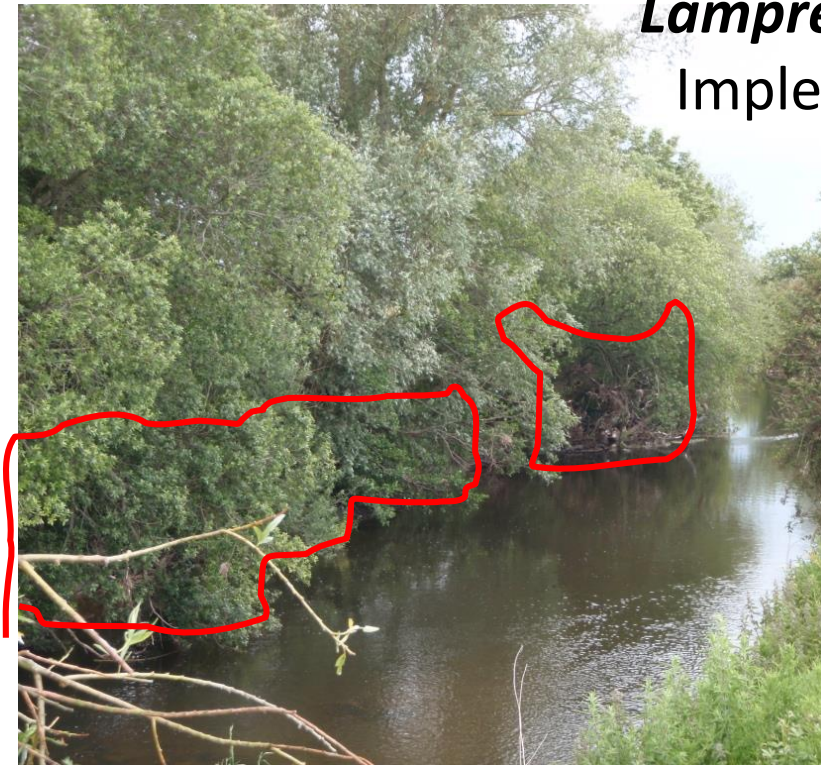
Ammocoetes = “piggy in the middle....”

OPW Environmental Guidance on channel maintenance



<http://www.opw.ie/en/FloodRiskManagement/Publications/>

Lamprey and OPW's Enhanced Maintenance: Implementation of 10-point environmental guidance notes



Managing conveyance –
retaining habitat and species



King JJ, Lehane BM, Wightman GD, Dooley R, Gilligan N. 2011. Development and implementation of environmental protocols in river maintenance in Ireland. *Water and Environment Journal* **25**: 422 - 428.

No work in gravel bed / spawning channels in fisheries
'closed season' **(Fisheries Acts)**





Retain vegetation at margins on non-working
side of channels

Permits siltation and retains silt

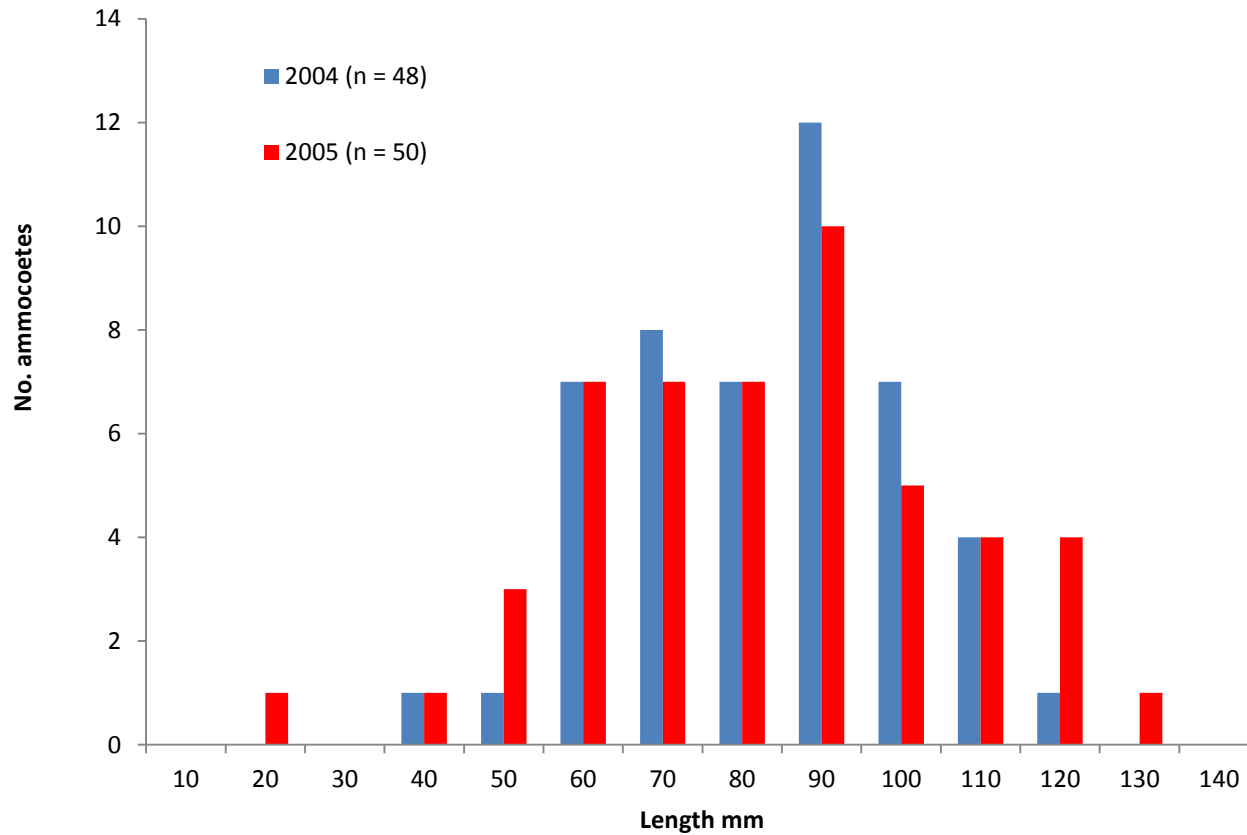
Confine desilting/weed removal to open water
area of cross-section

***Retains lateral silting areas and allows
colonisation***

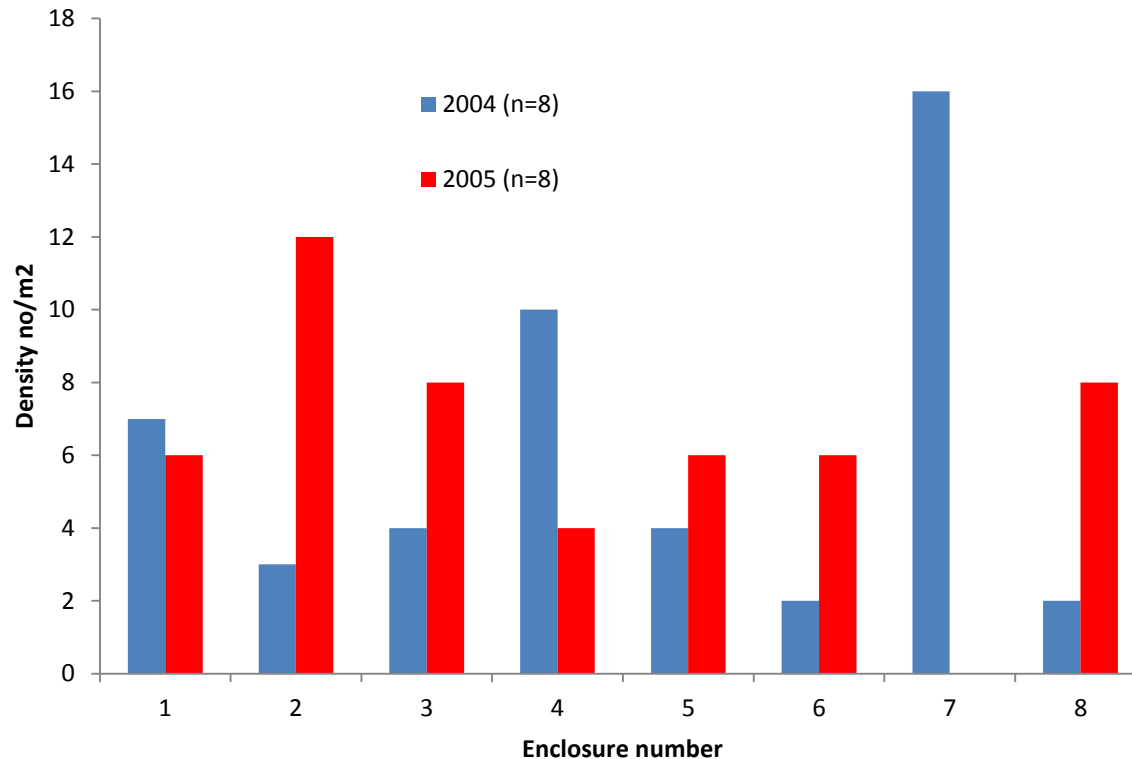


R. Deel (Boyne) 2004 – 05: ammocoete length frequency pre- and post-maintenance.

Enhanced maintenance options implemented



R. Deel (Boyne) ammocoete density pre- and post-maintenance. Enhanced maintenance options implemented



King, J.J., Wightman, G.D., Hanna, G. and Gilligan, N. (2015) River engineering works and lamprey ammocoetes; impacts, recovery, mitigation. *Water and Environment Journal*. 29, 482-488.

Mitigating for migration barriers



Mulkear LIFE Barrier Strategy I:



MulkearLIFE barrier strategy II:



Mitigating for migration barriers: making life a little more passable



Guidelines on Protection
of Fisheries During
Construction Works in
and Adjacent to Waters

2016



IFI issues

- Damage to habitat
- Interference with fish passage
- Timing of works
- Construction impacts
- Think **LAMPREY** at project design stage....its cheaper!



Thank You



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Inland Fisheries Ireland

<https://www.fisheriesireland.ie/extranet/fisheries-research-1/habitats/1440-habitats-directive-and-red-data-book-fish-species-summary-report-2016.html>