

BASG

The Present



The Broadland Pike project

Northern Pike: Angler collaborative study reveals validity of VI tag deployment and population dynamics assessment

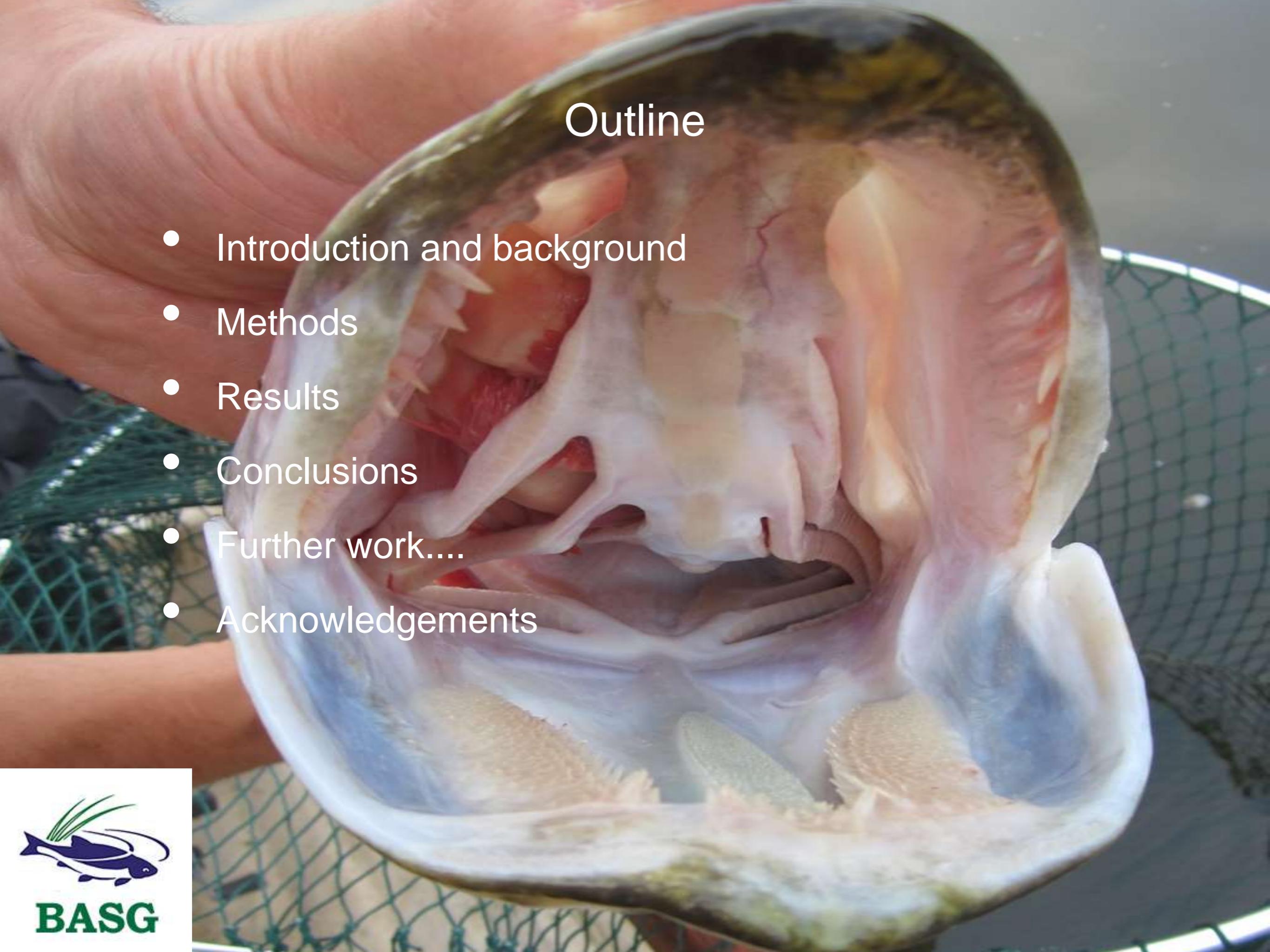
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Andy Hindes
Fishtrack



Environment
Agency



A close-up photograph of a large salmon being held by a person's hands. The fish is pinkish-orange with distinct vertical stripes and white pectoral fins. The background shows a green fishing net.

Outline

- Introduction and background
- Methods
- Results
- Conclusions
- Further work....
- Acknowledgements



Introduction

- Wide concern re decline of pike stocks (Lorenzoni et al., 2002; Nilsson et al., 2008; Lucentini et al., 2009; Baetens et al. 2013; Ouellet-Cauchon et al. 2014)
- Pike regarded highly by UK anglers
- Norfolk Broads famous pike fishery
- Concern re holiday pressure on pike stocks
- Requirement to understand the population
- Small steps at first.....



Assessment of capture recapture methods of pike in four small Finnish lakes, 2006-2009 (Adapted from Kuparinen et al.,

Lake	Method	2006 (%)	2007 (%)	2008 (%)	2009 (%)	2012). Lake mean <u>n</u> all yrs (± 1 S.E.)
Hokajärvi	Angling Lure	16 (27.1)	5 (20.8)	25 (34.7)	23 (29.1)	17.3 (4.52)
	Fyke	25 (42.4)	8 (33.3)	16 (22.2)	26 (32.9)	18.8 (4.23)
	Trap	16 (27.1)	9 (37.5)	28 (38.9)	27 (34.2)	20 (4.56)
	Gill net	2 (3.4)	2 (8.3)	3 (4.2)	3 (3.8)	2.2 (0.29)
Haarajärvi	Angling Lure	25 (29.1)	19 (17.1)	76 (33)	53 (35.8)	43.3 (13.19)
	Fyke	9 (10.5)	33 (29.7)	35 (15.2)	32 (21.6)	27.3 (6.12)
	Trap	52 (60.5)	57 (51.4)	115 (50)	61 (41.2)	71.3 (14.7)
	Gill net	0 (0.0)	2 (1.8)	4 (1.7)	2 (1.4)	2.0 (0.82)
Majajärvi	Angling Lure	35 (42.7)	28 (35)	10 (17.9)	13 (37.1)	21.5 (5.98)
	Fyke	15 (18.3)	35 (43.8)	7 (12.5)	2 (5.7)	14.8 (7.26)
	Trap	30 (36.6)	15 (18.8)	36 (64.3)	18 (51.4)	24.8 (4.96)
	Gill net	2 (2.4)	2 (2.5)	3 (5.4)	2 (5.7)	2.3 (0.25)
Haukijärvi	Angling Lure	17 (51.5)	10 (17.9)	3 (21.4)	7 (46.7)	9.3 (2.95)
	Fyke	9 (27.3)	32 (57.1)	4 (28.6)	3 (20)	12 (6.79)
	Trap	4 (12.1)	13 (23.2)	4 (28.6)	3 (20)	6.0 (2.35)
	Gill net	3 (9.1)	1 (1.8)	3 (21.4)	2 (13.3)	2.3 (0.48)
Angling annual mean <u>n</u> (± 1 S.E.)		23.25 (4.4)	15.5 (5.07)	28.5 (16.48)	24 (10.21)	

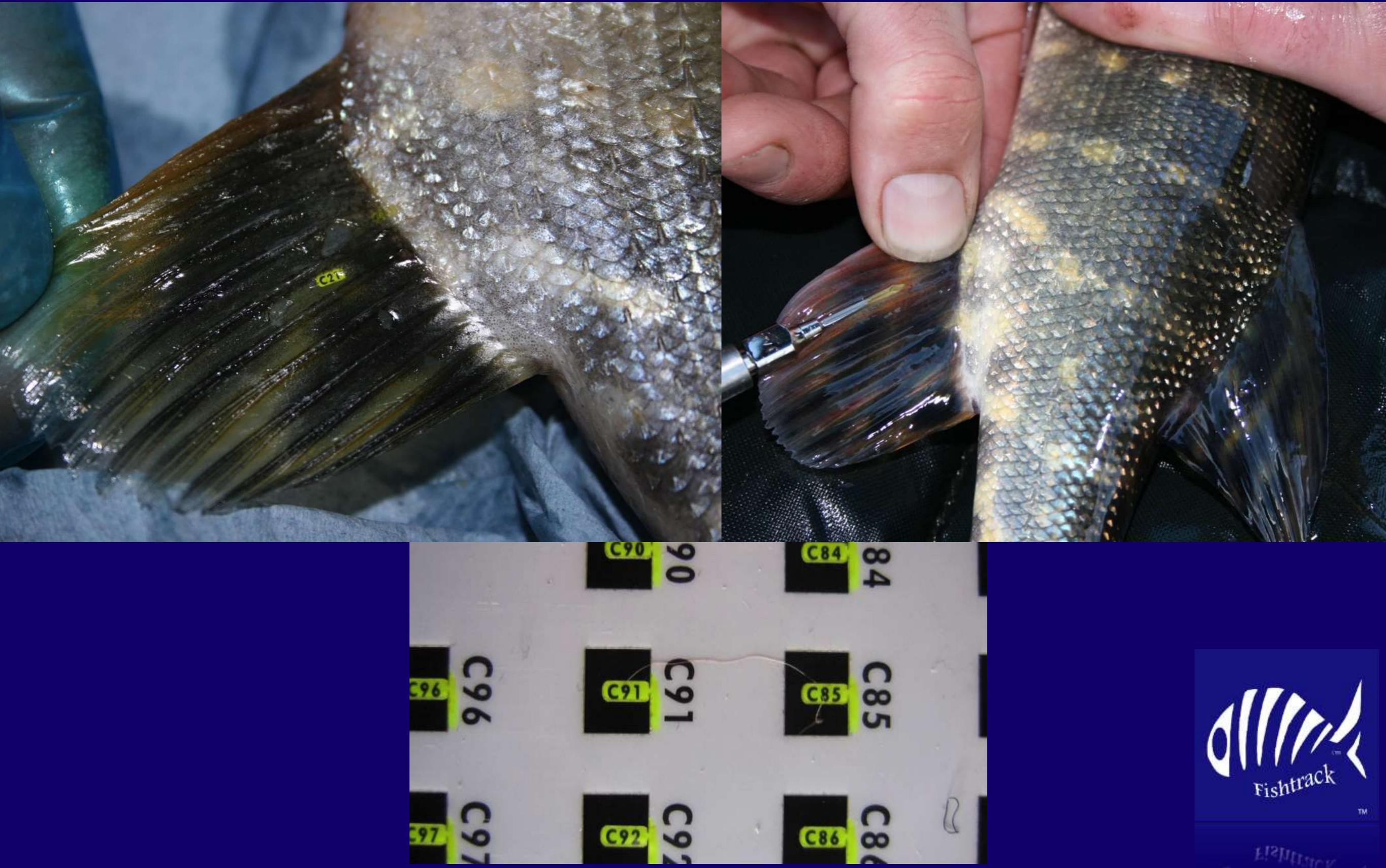
Review of VI studies

	Retention rate (%)	Fish size range (mm)	Duration (days)	
<i>Salvelinus alpinus</i>	68	100-150 <i>Fl</i>	30-365	Rikardsen (2000)
	96	150-200 <i>Fl</i>		
<i>Thymallus arcticus</i>	46	100-150 <i>Fl</i>	25-70	Rikardsen (2000)
	91	150-229 <i>Fl</i>		
<i>Thymallus arcticus</i>	98	137-236 <i>Tl</i>	30	McMahon et al, (1996)
<i>Salvelinus fontinalis</i>	63-100	211-470 <i>Tl</i>	29-100	Hughes et al. (2000) Zerrenner et al. (1997) Bryan et al. (1994)
	89-100	211-470 <i>Tl</i>	29-100	
	97-100	260-355 <i>Tl</i>	354-454	
	75	197-265 <i>Tl</i>	7-251	
	50	130-160 <i>Tl</i>		
	100	200+ <i>Tl</i>		
<i>Salmo trutta</i>	72	235-273 <i>Tl</i> μ	183	Summers et al. (2006)
<i>Oncorhynchus mykiss</i>	15	<200 <i>Tl</i> ^	182	Davis et al. (2014)
	25	<200 <i>Tl</i> `		
	28	200-300 <i>Tl</i> ^		
	63	200-300 <i>Tl</i> `		
	30	>300 <i>Tl</i> ^		
	75	>300 <i>Tl</i> `		
<i>Sander vitreus</i>	58	534 <i>Tl</i> μ	1825	Meerbeek et al. (2013)
	36			
<i>Esox masquinongy x Esox lucius</i>	92	91 <i>Tl</i> μ	28	Turek et al. (2014)
<i>Hatcheria macraei</i>	90	-	45	Barriga et al. (2014)
	80	-	200	
	66	-	254	
<i>Barbus haasi</i>	<20	<110 <i>Tl</i>	84-310	Aparicio & de Sostoa. (1999)
	46	>150 <i>Tl</i>		
	56	>200 <i>Tl</i>		
<i>Ophiodon elongatus</i>	100	152-190 <i>Tl</i>	160	Buckley et al. (1994)
<i>Sebastodes caurinus</i>	85	152-190 <i>Lt</i>	330	Buckley et al. (1994)



FISHTRACK

Methods



Results

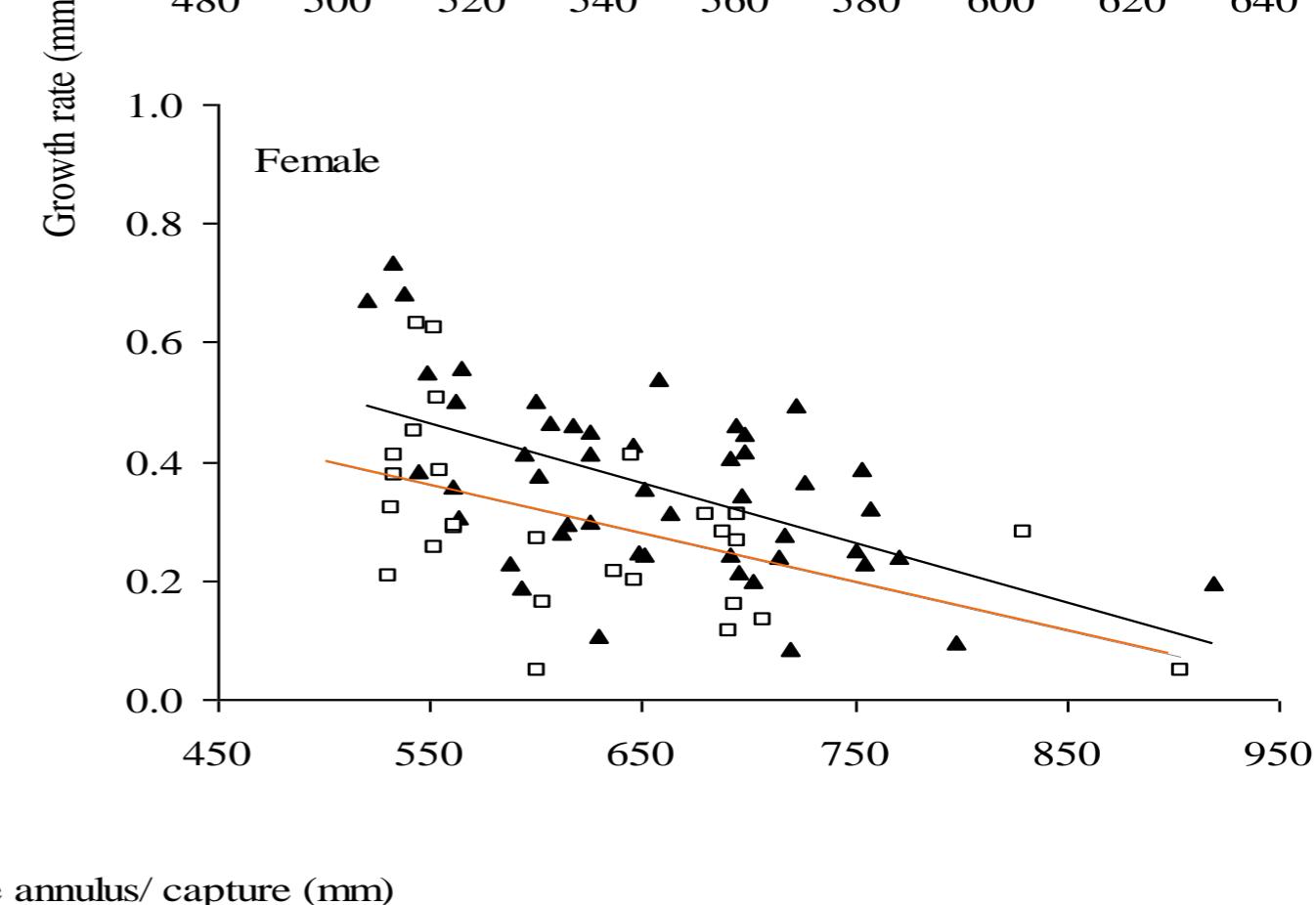
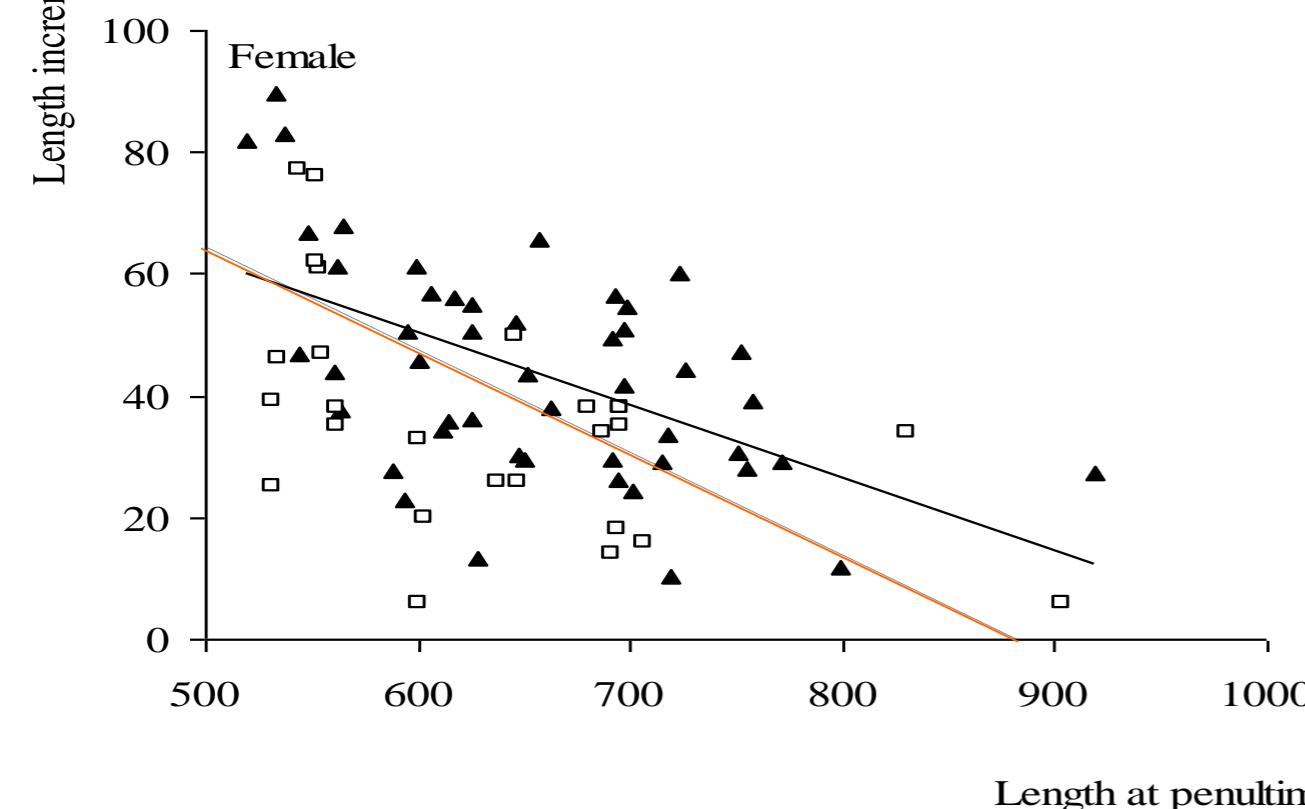
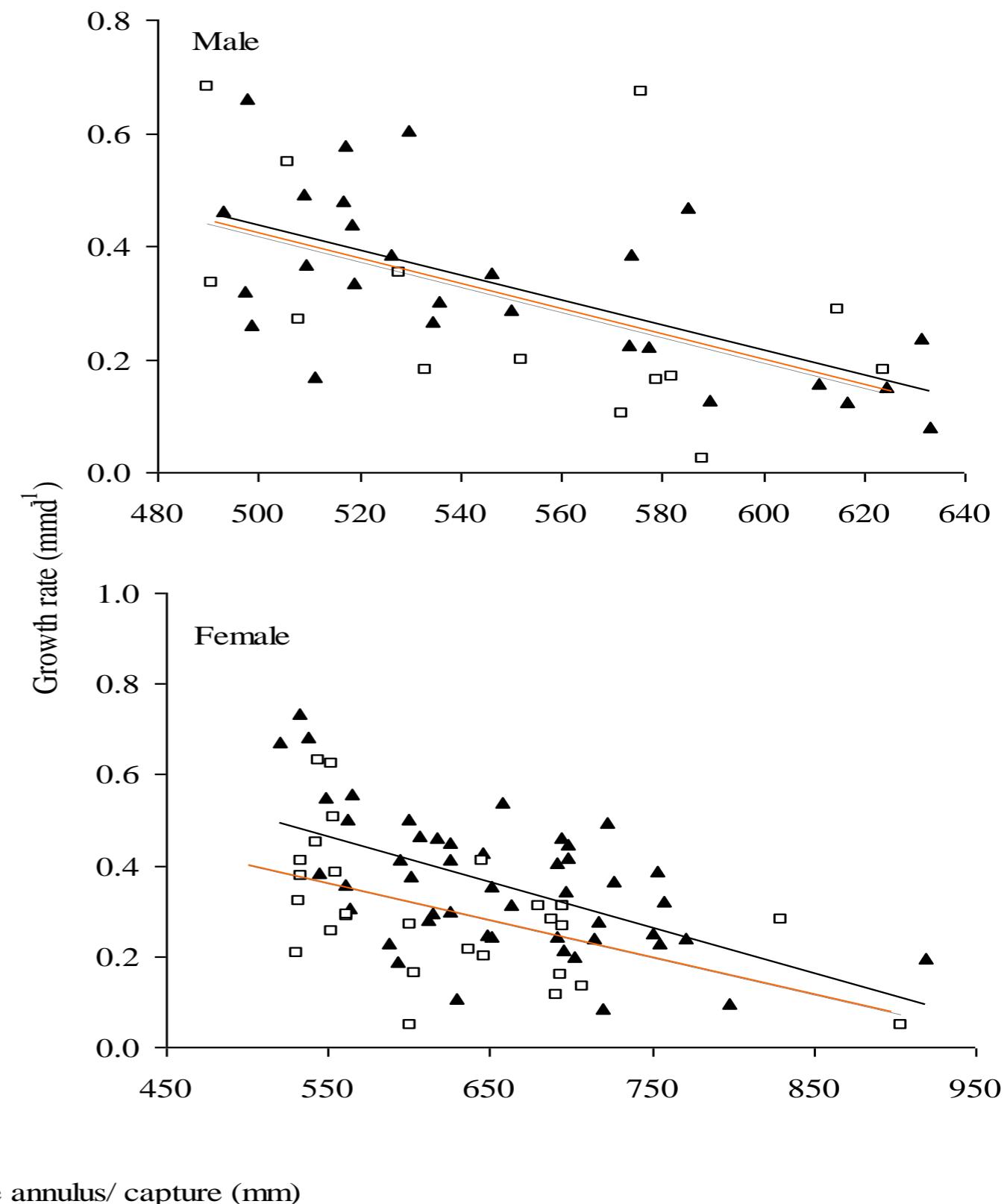
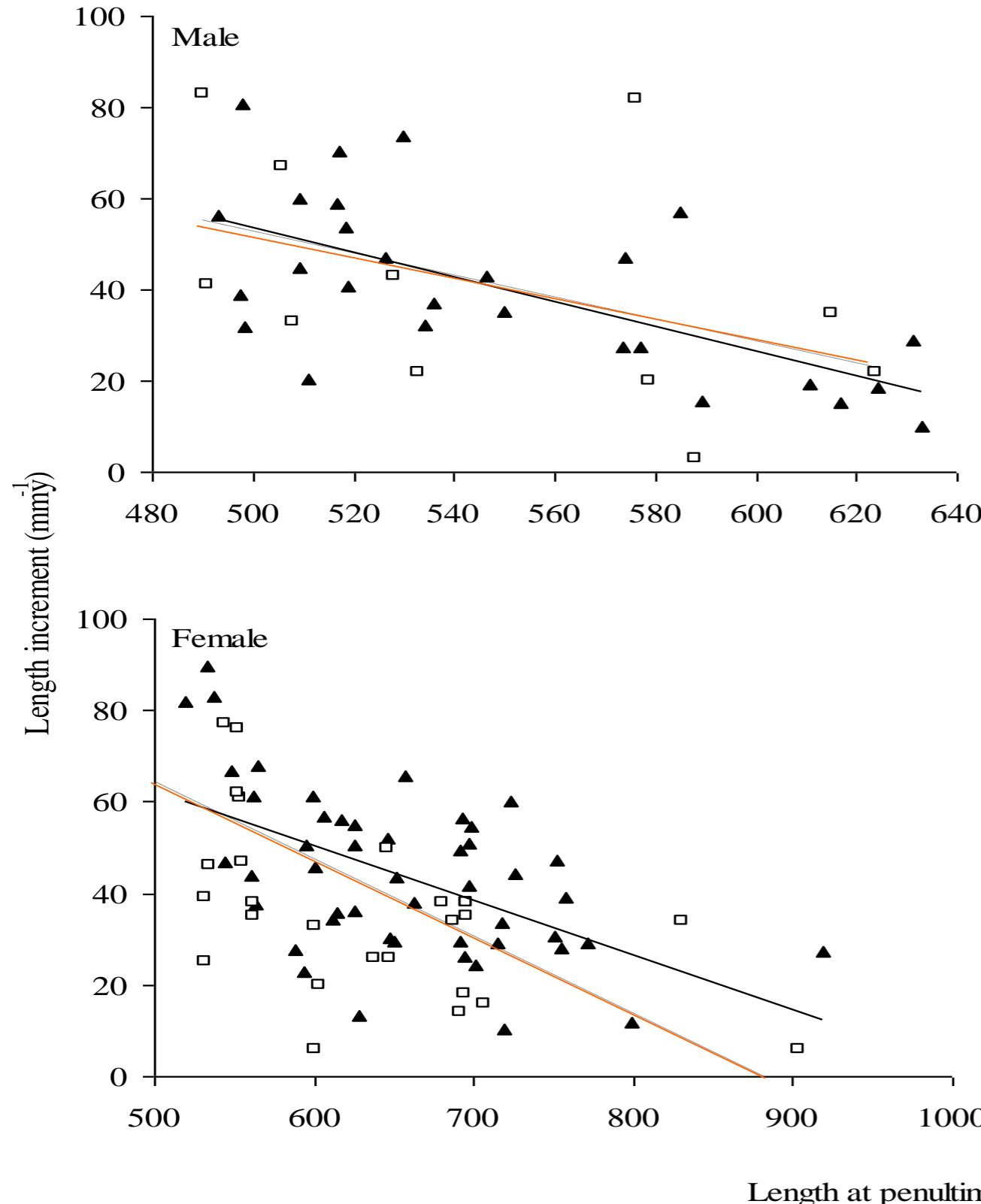
- 12 events over 2 year period
- Total angler effort = 149 man days (mean 12.4 ± 1.4 man days, range 3-19 man days)
- 522 pike captured (mean 35.3 ± 1.2 /day)
- 505 pike tagged
- 504 sexed; sex ratio = 1M : 1.4F significantly different to 1:1 ($\chi^2 = 16.07$; $P < 0.01$)
- Scale analysis estimated M 2-9 yrs old, F 2-11 yrs old
- Significant difference in the time between capture and recapture of fish retaining both tags (mean 195 ± 20 days) and retaining one tag (mean 337 ± 27 days), ($F_{1,89} = 18.32$, $P < 0.01$)
- Recapture time 14-1036 days (mean 251 ± 17)







Relationship of the back-calculated length at the penultimate annulus (triangles) and length at capture (squares) vs annual length increment and daily growth rate for male and female *Esox lucius*. Solid lines represent the significant relationship from linear regression between the variables from back-calculation; coloured lines represent the same relationship, but from mark-recapture data.

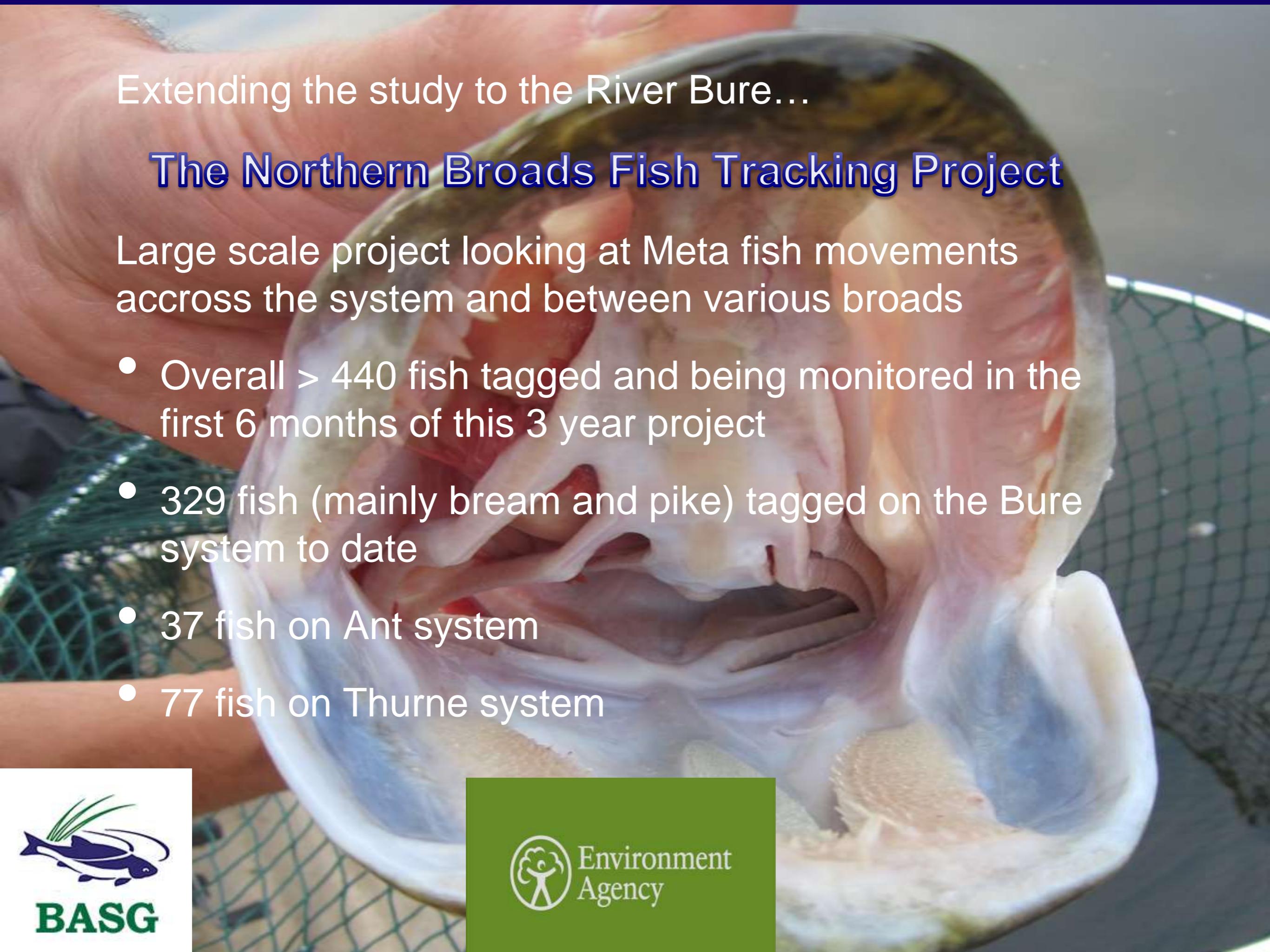


Conclusions

- High utility using anglers as citizen scientists
- VI tags suitable for long term studies (>2+ years)
- Outputs enabled
 - tag retention rate determination- 96%
 - population estimates (PMR 846; SMR 756)
 - age & growth rate analysis (2-11 yrs, F faster growing)
 - gender ratio (1M: 1.4F)
 - back calculated scale analysis of length-at-age tends to overestimate growth

Further work...

- Further scale analysis
- Stable Isotope work
- Comparative work
- Extending the study to the River Bure...underway

A close-up photograph of a fish, likely a bream, being held by a person's hands. A metal measuring tape is wrapped around the fish's body, extending from its head towards its tail. The fish has a mottled pattern of brown, tan, and white. The background is slightly blurred, showing what appears to be a fishing net.

Extending the study to the River Bure...

The Northern Broads Fish Tracking Project

Large scale project looking at Meta fish movements accross the system and between various broads

- Overall > 440 fish tagged and being monitored in the first 6 months of this 3 year project
- 329 fish (mainly bream and pike) tagged on the Bure system to date
- 37 fish on Ant system
- 77 fish on Thurne system



Acknowledgements

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- Supported by the BASC
- In-kind contributions from Pike Angling Club of Great Britain (PACGB) and Norwich and District Pike Club (NDPC)
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- Thanks also go to NDPC and Martham Angling Club for fieldwork
- Trinity Partnership for supporting access on broads owned by Essex and Suffolk Water



A photograph of a person in a small boat on a lake at sunset. The sky is filled with warm orange and yellow hues, reflected in the calm water. The silhouette of the person and the boat is visible against the bright horizon.

Thank you

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