Cormorant predation overlaps with fish communities and commercial-fishery interest in a Swedish lake

The increase of the fish-eating cormorant (Phalacrocorax carbo sinensis) in Europe has resulted in conflicts with fisheries. In Lake Roxen, Sweden, cormorants are blamed for causing a decrease in fishery catches. To study and describe the potential effects that cormorants may have had on fish in the lake, their diet was analysed in relation to fish catches in gill-net surveys and fishery catches. Estimates of predation were achieved by ‘tag and recovery’ on eel, pikeperch and perch. Cormorants predated on the most common species and sizes, which were mainly smaller perch, ruffe and roach (mean sizes of 9, 8 and 13 cm respectively). Tag recoveries from perch, eel and pike-perch detected predation estimates of 14, 7 and 15% respectively. From a highly eutrophic state, the lake has shown improvements in water quality and a development towards larger predatory fish was expected, but the results from gill-net surveys did not show this. Results indicated that cormorants and fisheries may both be responsible, but because cormorants remove more fish, they may be the main factor for the lack of recovery of large predatory fish. Their predation keeps recruitment high, but the number of fish that reach large sizes remains low.
Plan for fiskepleje i mindre vandsystemer mellem Varde Å og Vidå: Distrikt 28, 29 og 30

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 24
Publication date: 2016

Publication information
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: Danish
Series: Plan
Number: 50-2016
Main Research Area: Technical/natural sciences
Links:
http://www.fiskepleje.dk/vandloeb/udsaetning/oerred/udsaetningsplaner/vandloeb-i-vestjylland
Publication: Commissioned › Report – Annual report year: 2016

Plan for fiskepleje i Ryå: Distrikt 18 - vandsystem 13

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 36
Publication date: 2016

Publication information
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: Danish
Series: Plan
Number: 51-2016
Main Research Area: Technical/natural sciences
Links:
http://www.fiskepleje.dk/vandloeb/udsaetning/oerred/udsaetningsplaner/vandloeb-som-loeber-ud-i-limfjorden
Publication: Commissioned › Report – Annual report year: 2016

Egå Engsø - tab af havørredsmolt i en Vandmiljøplan II-sø

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Kristensen, M. (Intern), Koed, A. (Intern), Mikkelsen, J. S. (Intern)
Number of pages: 58
Publication date: 2014

Publication information
Publisher: Institut for Akvatiske Ressourcer, Danmarks Tekniske Universitet
ISBN (Electronic): 978-87-7481-182-4
Plan for fiskepleje i Sneum Å: Distrikt 28, vandsystem 06

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 36
Publication date: 2014

Plan for fiskepleje i tilløb til Roskilde Fjord: Distrikt 03, vandsystem 01-26

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Mikkelsen, J. S. (Intern), Carøe, M. (Intern)
Number of pages: 33
Publication date: 2014

Vådområde ødelagde bestanden af havørred

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Kristensen, M. (Intern), Koed, A. (Intern), Mikkelsen, J. S. (Intern)
Publication date: 2014
Plan for fiskepleje i Lerkenfeld Å: Distrikt 19, vandsystem 16

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 20
Publication date: 2013

Publication information
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: Danish
Series: Plan
Number: 28-2013
Main Research Area: Technical/natural sciences
Electronic versions:
Plan for fiskepleje i Lerkenfeld Å 2013- tekst
Plan for fiskepleje i Lerkenfeld Å 2013 - kort
Links:
http://www.fiskepleje.dk/vandloeb/udsaetning/oerred.aspx
Publication: Commissioned › Report – Annual report year: 2013

Plan for fiskepleje i mindre vandløb mellem Kåla Vig (inkl.) og Randers Fjord: Distrikt 14, vandsystem 01-31

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 36
Publication date: 2013

Publication information
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: Danish
Series: Plan
Number: 31-2013
Main Research Area: Technical/natural sciences
Electronic versions:
Plan for fiskepleje i mindre vandløb mellem Kåla Vig og Randers Fjord 2013 - tekst
Plan for fiskepleje i mindre vandløb mellem Kåla Vig og Randers Fjord 2013 - kort Nord
Plan for fiskepleje i mindre vandløb mellem Kåla Vig og Randers Fjord 2013 - kort Syd
Links:
http://www.fiskepleje.dk/vandloeb/udsaetning/oerred.aspx
Publication: Commissioned › Report – Annual report year: 2013

Plan for fiskepleje i Trend Å: Distrikt 19, vandsystem 13

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 16
Publication date: 2013

Publication information
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Plan for fiskepleje i Århus Å: Distrikt 13, vandsystem 20

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 26
Publication date: 2012

Publication information
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: Danish

Series: Faglig rapport fra DTU Aqua, Institut for Akvatiske Ressourcer, Sektion for Ferskvandsfiskeri og -økologi
Number: 19-2012
Main Research Area: Technical/natural sciences
Electronic versions:
Kort
Rapport
Links:
http://gis.dfu.min.dk/website/udsfisk/pdf/1320%20-%20Plan%20for%20Fiskepleje%20i%20%C3%85rhus%20-%202012.pdf
http://gis.dfu.min.dk/website/udsfisk/pdf/1320%20-%20Plan%20for%20Fiskepleje%20i%20%C3%85rhus%20-%202012-kortbilag.pdf
Publication: Commissioned › Report – Annual report year: 2012

Plan for fiskepleje i mindre tilløb til Randers Fjord: Distrikt 15, vandsystem 00-13

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Freshwater Fisheries Ecology
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 34
Publication date: 2012

Publication information
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: Danish

Series: Faglig rapport fra DTU Aqua, Institut for Akvatiske Ressourcer, Sektion for Ferskvandsfiskeri og -økologi
Number: 17-2012
Main Research Area: Technical/natural sciences
Electronic versions:
Kort
Rapport
Links:
Publication: Commissioned › Report – Annual report year: 2012
Plan for fiskepleje i Gudenå, delområde 3: Distrikt 15, vandsystem 06

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Christensen, H. A. (Intern), Mikkelsen, J. S. (Intern)
Number of pages: 54
Publication date: 2011

Publication information
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: Danish

Series: Udsætningsplaner
Number: 15-2011
Main Research Area: Technical/natural sciences
Source-ID: 279100
Publication: Research › Report – Annual report year: 2011

Plan for fiskepleje i mindre vandsystemer i området mellem Sandbjerg Vig nord for Juelsminde og Kalø Vig (Århus Bugt): Distrikt 13, vandsystem 01-24

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 35
Publication date: 2011

Publication information
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: Danish

Series: Udsætningsplaner
Number: 12-2011
Main Research Area: Technical/natural sciences
Source-ID: 279098
Publication: Research › Report – Annual report year: 2011

Udsætningsplan for Gudenå (3:3)

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Christensen, H. A. (Intern), Mikkelsen, J. S. (Intern)
Publication date: 2011

Publication information
Place of publication: Charlottenlund
Publisher: DTU Aqua. Institut for Akvatiske Ressourcer
Original language: Danish
Main Research Area: Technical/natural sciences
Source-ID: 268691
Publication: Research › Report – Annual report year: 2010

Udvandring af blankål fra Ribe Å i 2010
Effects of tag and suture type on survival and growth of brown trout with surgically implanted telemetry tags in the wild

To test the effects of surgical implants with or without external antennae, 188 wild brown trout Salmo trutta, 150 - 290 mm, were tagged and released in a small river in May 2005. After 5 months, 103 of the fish were recaptured and examined. Thus, information on the relative survival, growth and general condition of each fish was obtained. The relative survival did not differ between the three groups (control, antennae and no antennae), but the specific growth of the two tagged groups were lower than that of the control fish. The tag:body-mass ratio had a significant negative effect on specific growth. A relative high occurrence of tag expulsion was observed in both treatment groups (23%). The probability to expel a tag was correlated with the tag:body-mass ratio. Finally, the relative survival, growth, expulsion rate and general condition were compared between fish tagged with different types of suture material (absorbable v. non-absorbable). The results show only minor differences, but absorbable suture provided better wound healing and fewer expulsions. (c) 2008 The Authors Journal compilation (c) 2008 The Fisheries Society of the British Isles.
Udsætningsplan for Skjern Å: Distrikt 27 - vandsystem 01

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern), Christensen, H. A. (Intern)
Number of pages: 66
Publication date: 2008

Publication information
Place of publication: Silkeborg
Publisher: DTU Aqua, Sektion for Ferskvandsfiskeri
Original language: Danish

Series: FFI rapport
Number: 154
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 228695
Publication: Research › Report – Annual report year: 2008

Udsætningsplan for vandsystemer mellem Mariager Fjord (inkl.) og Limfjorden inkl. Villestrup Å: Distrikt 16 - vandsystem 01-22a

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Jørgensen, K. (Intern), Christensen, H. A. (Intern), Mikkelsen, J. S. (Intern)
Number of pages: 32
Publication date: 2008

Publication information
Place of publication: Silkeborg
Publisher: DTU Aqua, Sektion for Ferskvandsfiskeri
Original language: Danish

Series: FFI rapport
Number: 153
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 228694
Publication: Research › Report – Annual report year: 2008

Udsætningsplan for Giber Å: Distrikt 13 - vandsystem 17

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 10
Publication date: 2007

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish

Series: FFI rapport
Number: 143
Main Research Area: Technical/natural sciences
Udsætningsplan for Sneum Å: Distrikt 28 - vandsystem 06

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 29
Publication date: 2007

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish

Series: FFI rapport
Number: 145
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226668
Publication: Research › Report – Annual report year: 2007

Udsætningsplan for Vejle Å: Distrikt 12 - vandsystem 16

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 22
Publication date: 2007

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish

Series: FFI rapport
Number: 144
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226678
Publication: Research › Report – Annual report year: 2007

Udsætningsplan for tilløb til Køge bugt: Distrikt 2 - vandsystem 15-18; Distrikt 5 - vandsystem 1-13

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 25
Publication date: 2006

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish

Series: FFI rapport
Number: 137
Main Research Area: Technical/natural sciences
Source: orbit
Udsætningsplan for vandløb til Roskilde fjord: Distrikt 3 - vandsystem 1-26

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 25
Publication date: 2006

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 134
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226673
Publication: Research › Report – Annual report year: 2006

Udsætningsplan for Lerkenfeld Å

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 14
Publication date: 2005

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 128
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226661
Publication: Research › Report – Annual report year: 2005

Udsætningsplan for mindre vandsystemer mellem Ringkøbing og Varde

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 22
Publication date: 2005

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 129
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226664
Udsætningsplan for Trend Å

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 13
Publication date: 2005

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 127
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226672
Publication: Research › Report – Annual report year: 2005

Udsætningsplan for mindre vandløb mellem Kalø Vig og Randers Fjord

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 25
Publication date: 2004

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 111
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226663
Publication: Research › Report – Annual report year: 2004

Udsætningsplan for Skals Å

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 21
Publication date: 2004

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 115
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226667
Publication: Research › Report – Annual report year: 2004
Udsætningsplan for Gudenå, (3:3) delområde 3

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Dolby, J. (Intern), Mikkelsen, J. S. (Intern)
Number of pages: 35
Publication date: 2003

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 108
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 225300
Publication: Research › Report – Annual report year: 2003

Udsætningsplan for thylandske vandløb

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 25
Publication date: 2003

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 105
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226671
Publication: Research › Report – Annual report year: 2003

Udsætningsplan for Grenå : Distrikt 14 - vandsystem 17

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 19
Publication date: 2002

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 96
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226657
Publication: Research › Report – Annual report year: 2002
Udsætningsplan for tilløb til Limfjorden i Nordjyllands Amt, distrikt 18 - vandsystem 1-24 og distrikt 19 - vandsystem 1-16 og 46-61

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 26
Publication date: 2001

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 89
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226670
Publication: Research › Report – Annual report year: 2001

Udsætningsplan for Skjern Å. Distrikt 27 - vandsystem 1

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern), Sivebæk, F. (Intern)
Number of pages: 68
Publication date: 2000

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 87
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226665
Publication: Research › Report – Annual report year: 2000

Udsætningsplan for Vejle Å

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 26
Publication date: 1999

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 76
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226676
Publication: Research › Report – Annual report year: 1999
Udsætningsplan for mindre vandsystemer mellem Varde Å og Vidå

General information
State: Published
Organisations: Section for Freshwater Fisheries Ecology, National Institute of Aquatic Resources
Authors: Mikkelsen, J. S. (Intern)
Number of pages: 16
Publication date: 1997

Publication information
Place of publication: Silkeborg
Publisher: Danmarks Fiskeriundersøgelser
Original language: Danish
Series: FFI rapport
Number: 63
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226662
Publication: Research › Report – Annual report year: 1997

Projects:

Expertise in marine and aquatic ecology and genomics for sustainable management of fish and shellfish in Skagerrak-Kattegat-Øresund (MarGen) (39301)
The marine and freshwater regions encompassing Skagerrak, Kattegat, Øresund and the North Sea are biologically highly productive and contain plentiful living aquatic resources that are important for the region. At the same time the coastal areas are densely populated and industrialized, fish and shellfish resources are heavily harvested, and waters are subject to pollution and eutrophication. The region is also markedly affected by the ongoing global warming, with sea temperature rising nearly 2 degrees C during the last 40 years. These environmental pressures call for investigations into the consequences for aquatic organisms, their potential for adapting to environmental changes, and for identifying management strategies that could mitigate deteriorating environmental conditions, using state-of-the-art methodology. Here, we will capitalize on the revolutionizing developments in genomics, electronic tagging and computer modelling to obtain insights on the ecology, evolution and management of aquatic biodiversity in the region.

The ØKS region harbours leading scientific environments within the aquatic, marine and genomic sciences that are complementary with respect to research and education and that would strongly benefit from better integration and networking. This proposal also aims to establish a research cluster and expand the number of active PhDs, postdocs and senior researchers within the region, thereby fostering an innovative research and educational network in the ØKS region.

This project is coordinated by DTU Aqua.

The project is funded by EU, InterReg (regional collaboration).

National Institute of Aquatic Resources
Section for Marine Living Resources
Institute of Marine Research
University of Gothenburg
Aarhus University
University of Oslo
Norwegian Institute for Water Research
University of Agder
Period: 01/07/2015 → 30/06/2018
Number of participants: 8
Research areas: Population Genetics & Freshwater Fisheries and Ecology
Project participant:
Bekkevold, Dorte (Intern)
Aarestrup, Kim (Intern)
Population dynamics of stocked eel in a river system (38261)
The objectives are to evaluate the effect of stocking eel in a river system, and examine how anthropogenic factors such as weirs, trout farms and ponds in a river system may delay or hinder the downstream migration of silver eel.

A few studies have previously been performed to assess the biological value of stocking elvers in small to medium size streams. The studies however showed, that the eels either suffer high mortality or disperse to downstream sections of the streams where monitoring by electro fishing is not possible. Thus, only limited information on the fate of the stocked elvers is available. This project seeks to alleviate this shortcoming.

No, or only very little, natural recruitment occurs to the upper part of River Gudenå. Therefore, the area is excellent for eel stocking experiments, and all migrating fish can be monitored in a downstream fish trap.

During 1987, 1988 and 1992 the area was stocked with 1.6 million elvers. In 2001 and 2002 coded wire tagged eels of size 3.5 gram and 10 gram were stocked. The size and age composition of the silver eel run at Vestbirk fish trap suggest that most males from these stockings have by now, left the feeding areas during the spawning runs, whereas older females are immigrating in these years. All eel passing the trap are being recorded and measured. The population parameters; growth rate, numbers, sex and age at silvering are used to describe the yield of the stockings.

Silver eels leaving the upper reaches of the River Gudenå have to pass several weirs and lakes when migrating towards the sea. How these obstructions influence the migration is largely unknown, but a delay and possibly a higher mortality may be expected. Migrating silver eels are equipped with telemetric tags (PIT) and the progression rate of downstream migrants will be recorded by automatic listening stations and manual tracking.

Silver eel biomass and non-fishing mortality (38845)
The EU-plan for restoring the European eel population, requires for each MS to issue a national Management Plan and report status of the eel population to the EU Commission in 2012 (and 2015, 2018). Among other things, the report must include estimates of the total production of silver eels (from freshwater), the magnitude of non-fisheries mortality and the reduction of this due to management measures.

This project aimed at providing solid estimates of mortality and biomass. This was be done by trapping silver eels in a number of representative river-systems and extrapolate the results to a national level. The mortality in association with hydropower passage has already been measured (and published), but the mortality of silver eels migrating pass fish farms (with weirs) was measured using radio-telemetry. Sixty migrating silver eels will be radio tagged (surgical implants) and followed on their way downstream in the river Kongeå, where they had to pass 3 fish farms to reach the sea. The results revealed massive loss and delay of silver eels at fish farms.

This project was coordinated by DTU Aqua.

The project was funded by the Danish Ministry of Food, Agriculture and Fisheries.
Survival and growth of eel in coastal habitats (38830)

Very little is known about settling, habitat utilization and survival of European eel (Anguilla anguilla) in coastal areas (fjords and estuaries). We don’t know what proportion of elvers take residence in the coastal zone. For eels stocked in fjords and estuaries, only little is known about survival and growth. In Denmark it has been suggested that the main production of eel takes place in the coastal areas and not in freshwater. Thus, it is very important to obtain some information about this to enhance our management of this threatened species.

The overall objective is to investigate the importance of various marine habitats for settlement, density, survival and growth of eel. In relation to survival, the importance of fishing and cormorant predation will be sought estimated.

In the first stage (pilot) new sampling methods are being tested in order to be able to generate data about the juvenile eel in the coastal habitats. This is not trivial as no methods have proved effective in sampling small (<15 cm) eels on the coast. To distinguish between wild and stocked eels, 25,000 coded wire tagged eels have been stocked in a semi-closed estuary and the lower river. Spring and fall sampling will provide information on relative survival and growth of these and wild eels.

Assess the yield from eel stocking in a marine fjord (38262)

The overall objective of the project was to estimate the outcome of stocking eel in a marine area, to estimate the yield to the fishery and the proportions of eels escaping the fishery. To reach this goal it was necessary to estimate the total catch in the fjord, the fishing mortality and whether eels stay in the fjord area or migrate to adjacent waters.

Stocking is a widely used measure to enhance local eel populations throughout Europe. About 1.5 million elvers are stocked annually in Danish marine waters. There are only vague indications that these stockings actually improve the number of fish that are available to the fisheries and the spawning population.

In 1998 and 1999 a total of 100,000 coded wire tagged eel were stocked in the inner parts of Roskilde Fjord. During 1999-2015 the eel catches made by professional and recreational fishermen were analyzed for recapture of tagged fish in order to establish the ratio of tagged to untagged fish in the eel catches. Based on the knowledge of numbers of fish caught in the yellow eel fishery as well as the silver eel fishery, the yield to the fishery was calculated. Migration patterns of the stocked eel were studied by collecting data from different strata of the fjord and adjacent fisheries, Isefjord and Arresø. Migrating silver eels were Carlin tagged and released to the fishery in September and October. Based on reported recaptures from fishermen an estimate of fishing mortality was established as well as of the number of silver eels leaving the Fjord and migrating toward the Sargasso spawning grounds. The total catches made by recreational fishermen were established through questionnaires to recreational fishermen.

The overall result suggests that about 13 % of the stocking were captured by the fishery in Roskilde Fjord and 5 % left the fjord as silver eels on spawning migration.
This project was coordinated by DTU Aqua.

The project was funded by the Danish Rod and Net License Funds.

National Institute of Aquatic Resources

Section for Freshwater Fisheries Ecology
Period: 01/01/1996 → 31/12/2015
Number of participants: 5
Research areas: Freshwater Fisheries and Ecology & Coastal Ecology

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