FORSKNINGS- OCH UTVECKLINGSINSTITUTET

Aronia Research 2012

VID ÅBO AKADEMI OCH YRKESHÖGSKOLAN NOVIA

Contents

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Preface

As the year 2012 came to an end it had become increasingly clear that Aronia has found its role in the highly complicated cross-pressures of a wide range of scientific, environmental, societal and educational encounters. Our approach, combining a targeted scientific expertise with a dynamic set of applied projects, makes it possible to act on a regional scale with global scenarios as a framework. We thus feel well prepared to meet the challenges of the EU Horizon 2020 key targets, Excellent Science, Better Society.

It is especially encouraging that the cooperation with the Town of Raseborg has been successful. A number of deliverables were produced during the year and a lot more are under different stages of progress, as can be seen in the project presentations below. On Campus, the broad Knowledge Cluster, involving more than half a dozen actors, is determinedly working towards the establishment of specific facilities for intensified and widened forthcoming joint ventures. At the heart of the cluster lies the GeoDesign Center, currently successfully applying state of the art software, including CommunityViz, for municipal planning.

Furthermore, collaborations with the educational unit at the Campus has been active, ranging from engaging students in project work integrated in courses, to internship and Bachelor's theses. At Åbo Akademi two doctoral theses were presented and several courses given during the year.

The year 2012 was also the final year for the first Aronia Coastal Zone Research Team ever. Part of the great results produced by the team can be seen in the research group presentations below. The highlight of the year, without comparison, for Aronia was the confirmation that ACZRT was granted a second period of activity. This in itself is a testimony of a very broad appreciation of the results of the first period. A sincere acknowledgment of all members of the pioneering team (2008-2012) is more than called for.

Photo Rolf Holmberg

Cyanobacteria and Zooplankton Interactions with Eutrophication and Climate Change

Jonna Engström-Öst, Andreas Brutemark, Maiju Salonen, Anna-Karin Sandbacka & Anu Vehmaa

This project focuses on toxic cyanobacteria bloom ecology and how cyanobacteria interact with zooplankton, other algae and fish larvae.

Highlights of the year

Acidification of the seas, caused by increased dissolution of CO2 into surface water and global warming, challenge the adaptation mechanisms of marine organisms. In boreal coastal environments, temperature and pH vary greatly seasonally, but sometimes also rapidly within hours due to upwelling events. We studied if copepod zooplankton that live in a fluctuating environment, are tolerant to climate change effects, predicted for 2100. Egg production of the copepod *Acartia* sp. was followed in different temperature and pH conditions (Vehmaa et al. 2012, Vehmaa 2012). Egg production was higher in treatments with warmer temperature but the increase was smaller when copepods were simultaneously exposed to warmer temperature and lowered pH. When pH changed between the egg production and hatching conditions, it resulted in lower hatching success, but the effect was diminished over the course of the experiment possibly due to improved maternal provisioning. Our preliminary results indicate that copepods can incur costs from the combined effect of two climate induced change, warming and acidification, but that these costs can partly be combated by adaptive maternal effects. The ability of copepods mothers to invest in their eggs depends on their own condition, which is dependent on the availability and quality of their food, mainly phytoplankton. Therefore, the ability of copepods to produce offspring, which succeed well in the future sea, depends on the response of phytoplankton to the climate change.

Amanda Dwyer, Andreas Brutemark and Anu Vehmaa starting up an experiment in the lab. Photo Jonna Engström-Öst

Pike larva (*Esox lucius*, gädda). Photo Maiju Salonen

In summer 2012 we continued to work on ocean acidification in collaboration with Prof. Ulf Riebesell (GEOMAR, Kiel, Germany) who set up large mesocosms off Tvärminne Zoological Station together with ~50 researchers from Germany, UK and Finland. The results we obtained on copepod reproduction, stress levels, growth and fatty acid composition are currently under preparation.

We were also visited by Bart De Stasio and Amanda Dwyer from Lawrence University, USA with whom we stud-

Övergödning, klimatförändring och blågrönalger

Blågrönalger och djurplankton i ett övergött hav som plågas av klimatförändring är vårt fokusområde. Vi jobbar främst utgående från Tvärminne zoologiska station i Hangö. Under året producerade vi hela två doktorsavhandlingar (Maiju Salonen och Anu Vehmaa). Vi jobbade också ihop med en stor forskargrupp från Kiel i ett mega-experiment om försurning i havet ute på Tvärminne Storfjärden.

”Tar vi effekten av ett småningom surare hav till följd av klimatuppvärmning och kopplar det till ett allt varmare hav kan vi se följder för små kräftdjur, de tycker inte om den sammantagna effekten. Det här kan leda till förändringar i ett framtida hav som kan ha stora följder” (Vehmaa 2012).

”Övergödning i havet ger grumligt vatten, vilket kan ställa till det för gäddyngel som inte kanske kan äta och växa till sig som förut. Det här kan bero på att kvaliteten på födan är sämre i områden som tidigare var bra för gäddyngel, och understryker att det inte alla gånger är lätt att hitta enkla lösningar för fiskevård” (Salonen 2012).

ies cyanobacteria-zooplankton interaction. A visit to their lab in Green Bay, Michigan Lake is under planning.

Salonen (2012) showed in her PhD thesis that phytoplankton-induced turbidity can have a negative effect on pike (*Esox lucius*) larval condition and growth. Turbidity also changed prey capture by diminishing the number of captured copepods. Salonen measured the food quality of prey, preferred by pike, and more prey with more fatty acids were found at the outer archipelago sites. The density and condition of larval pike was decreasing towards the outer archipelago sites together with increasing exposition to pelagic circumstances. The occurrence and density of important prey species explain the distribution of larval pike in the archipelago areas. On the other hand, larval pike do not disperse much from the spawning grounds; hence the occurrence is also related to adult pike spawning behaviour. As the internal loading of nutrients sustains the eutrophicated and turbid conditions of the sea for a long period of time, Salonen’s results are important especially from a management and fisheries point of view.

Collaboration

- Prof. Elena Gorokhova, Stockholm University, Sweden (oxidative stress, molecular analyses)
- Prof. Ulf Riebesell GEOMAR, Germany (ocean acidification)
- Prof. Bart De Stasio, Lawrence University, U.S.A. (cyanobacteria-zooplankton interactions)
- Prof. Kaarina Sivonen, University of Helsinki, Finland (cyanobacteria ecology)
- Dr. Sari Repka, University of Turku, Finland (cyanobacteria ecology)
- Prof. Antonella Luglié & Nicola Secchi, Universitá di Sassari, Italy (LTER collaboration)
- Prof. Anas Ghadouani, University of Western Australia, Australia (cyanobacteria-zooplankton interactions)
- Dr. Maiju Lehtiniemi, SYKE, Finland & Dr. Sanna Suikkanen, SYKE, Finland (long-term data analyses)

Publications 2012

Carlsson, P., Granéli, E., Granéli, W., Gonzalez Rodriguez, E., Fernandes de Carvalho, W., Brutemark, A. & Lindehoff, E. 2012. Bacterial and phytoplankton nutrient limitation in tropical marine waters, and a coastal lake in Brazil. Journal of Experimental Marine Biology and Ecology 418/419: 37-45.

Granéli, E., Esplund, C., Lindehoff, E. & Brutemark, A. 2012. Minimizing ecological losses with the help of “real time” algal surveillance. Linnaeus eco-tech 2012 Proceedings. November 26-28,2012 Kalmar, Sweden. ISBN 978-91-86983-86-4

Grubisic, L.M., Brutemark, A., Weyhenmeyer, G.A., Wikner, J., Båmstedt, U. & Bertilsson, S. 2012. Effects of stratification depth and dissolved organic matter on brackish bacterioplankton communities. Marine Ecology Progress Series 453: 37-48.

Salonen, M. 2012. The effect of turbidity on the ecology of pike larvae. PhD thesis, University of Helsinki.

Vehmaa, A. 2012. Climate driven changes in temperature, pH and food quality -Effects on copepod reproduction. PhD thesis, Åbo Akademi University.

Vehmaa, A., Brutemark, A. & Engström-Öst J. 2012. Maternal effects may act as an adaptation mechanism for copepods facing pH and temperature changes. PLoS One 7(10): e48538.

Vehmaa, A., Kremp, A., Tamminen, T., Hogfors, H., Spilling, K. & Engström-Öst, J 2012. Copepod reproductive success in spring bloom communities with modified diatom and dinoflagellate dominance. — ICES Journal of Marine Science 69: 351-357.

Anna-Karin Sandbacka sampling from a mesocosm unit. Photo Niklas Virkkala

Ecosystem Services for Evidence-based Conservation ESEC

Traci Birge, Marianne Fred, Kajsa Mellbrand, Mari Pihlajaniemi (coordinator COAST-MAN)

The Ecosystem Services Research Group focuses on improving sustainability, species and habitat conservation, management of cultural landscapes, and comparing ecosystem services in local food networks. The topics taken up by the group are diverse and projects involve community outreach, research, and teaching at Åbo Akademi University and Novia. The common theme for all of the projects is that they explore ecosystem services as a tool for reaching conservation goals. We have adopted the evidence-based conservation paradigm, with the aim of providing the community with evidence-based information to aid in decision making at all levels of organisation.

Highlights of the year

Within the Ecosystem Services Research Group we continue our research on ecosystem services mainly through associated projects:

Kajsa Mellbrand in the Interreg project Green Islands continues focusing on ecosystem services of islands. In 2012 Kajsa has mainly interviewed islanders about their perceptions of ecosystem services and how they use the services on the islands. Kajsa has also co-supervised an questionnaire survey on boating people's perception of the water quality in the Baltic Sea. Green Islands is cooperating with the GIS-center at Campus Raseborg led by Romi Rancken. Within the cooperation Romi and Marianne have started developing ways to make ecosystem services spatially explicit through mapping ecosystem service approximations.

COAST-MAN SGA, has been updated in Autumn 2012 when coordinator Mari Pihlajaniemi together with Traci Birge reformulated the aims and goals of the project inspired by a network meeting in Bilbao, Spain in December 2011. Mari also wrote the structure of a scenario building project within COAST-MAN which also has been sent out as a grant proposal. In the beginning of 2012 ESEC and members of the environmental agency in Raseborg and Aronia participated in a two day workshop on valuing ecosystem services in local policy making at Campus Raseborg. The workshop was organised by Albaeco, Natur och Miljö and Luonnonsuojeluliitto and the chairperson was Louise Hård av Segerstad from Albaeco.

Inspecting invertebrates in a newly established wetland. Photo Rolf Holmberg

A tasty ecosystem service. Photo Marianne Fred

The endangered Apollo (*Parnassius apollo*) butterfly was successfully reintroduced to the Tammisaari Archipelago National Park in the Finnish Academy funded project studying the habitat requirements of the Apollo ending 2010. Monitoring of the reintroduced populations is ongoing and even in the rainy summer of 2012 larvae and adult butterflies were found in the outermost archipelago. In 1995 a survey on selected meadows was performed throughout Uusimaa by Pykälä & Bonn. In summer 2012 Marianne Fred and Traci Birge revisited the meadows in Raseborg to assess their current management and status, and to evaluate the predictions made by Pykälä and Bonn

Ekosystemtjänster för bevis-baserat bevarande ESEC

Ekosystemtjänster är gratistjänster vi får från naturen, och inom ramen för den forskning vi gör tittar vi på hur hållbart utnyttjande av ekosystem skall kunna göras, och hur arter kan skyddas och landskap vårdas.

”Vi har åkt omkring i skärgården och pratat ihop oss med öbor och båtfolk, och kartlagt hur folk ser på gratistjänsterna vi får av naturen, och hur vi skall bevara dem. Vi har diskuterat hur vi kan värdesätta gratistjänsterna, vad är t.ex. en rökt flundra värd?”

”I Ekenäs skärgård har vi återinfört apollofjärilen som varit utdöd, med hyfsad framgång. Vi har också karterat ängslandskap, och tittat på hur dessa kulturomgivningar bäst kan bevaras – hur värdesätter de som upprätthåller öppna beteslandskap, främst gårdar med köttboskapsproduktion å ena sidan landskapet i sig och å andra sidan de existerande möjligheterna till extra utkomststöd?”

(Pykälä & Bonn 2000). The most evident result from the 2012 survey was that traditional rural biotopes (TRB) are mainly upheld by meat-production animals, making the direct connection between conservation and local food production. Some of the key results of Traci Birge’s studies on the maintenance and management of TRB’s are that TRB stewards want to manage TRBs and many manage the sites primarily for non-economic reasons. Landscape aesthetics are important to the stewards but the economics mean that they can only manage the sites until it gets too expensive. Stewards with direct sales or services on their farms are more likely to manage TRBs for non-economic reasons.

Traditional rural biotope in center of Pohja village. Photo Marianne Fred

Publikation

Kettunen, M., Vihervaara, P., Kinnunen, S., D’Amato, D., Badura, T., Argimon, M. & Ten Brink, P. With contributions from Birge, T. & Pihlajaniemi, M. 2012. Socio-economic importance of ecosystem services in the Nordic Countries. Synthesis in the context of The Economics of Ecosystems and Biodiversity (TEEB). TemaNord 2012:559

Collaboration

- Bra Mat i Västnyland project, Finland
- Green Islands project, Finland, Sweden & Estonia
- iCCB (integrated climate change biology programme IUBS)
- SGA Network
- UNEP-WCMC (World Conservation Monitoring Centre), UK
- GIS-center at Campus Raseborg, Finland

Anne Palkeinen (student at the Degree Programme Integrated Coastal Zone Management, UAS Novia) distributing questionnaires among boat tourists in the port harbour of Kurresaare on the island Saaremaa in Estonia. Anne has recently finished her bachelor project about environmental attitudes of boat tourists.

Experimental Rocky Shore Ecology

Patrik Kraufvelin, Eliecer Díaz & Jörg Sareyka

We are investigating the effects of human-induced pressures on marine benthic communities by coupling field observations/experiments with controlled studies in mesocosms and/or aquaria.

Highlights of the year

During 2012, we have conducted active research on rocky shores of the Baltic Sea (Tvärminne and the Åland Islands), in Norway, but also at European (MARBEF) and even at the global scale (GAME, South-Africa). The most recent highlights are grouped into four different subtopics below.

1. Foundation species on rocky shores: We are studying the performance of bladder-wrack, *Fucus vesiculosus*, and blue mussels, *Mytilus edulis*, and possible consequences of changes in the occurrence of these foundation species for the biodiversity of associated macrofauna under escalating threats from human activities. Most recently, we have shown that bladder-wrack receptacles mature 3-4 weeks earlier during early springs compared to late springs (Kraufvelin et al. 2012). This climate-change induced mismatch between the timing of bladder-wrack reproduction and maximum occurrence of competing filamentous algae might cause a missed "window of opportunity" and reduced bladder-wrack distribution.

2. Controlled experiments in Solbergstrand mesocosms: All projects ran in these artificial rocky shore systems hitherto have the inherent capacity to provide controlled information about community and ecosystem responses to various combinations of environmental stressors and thereby they contribute both to basic and applied aspects of science generating high-quality data ready for use. Most recently, we have shown that eutrophication affects the grazing dynamics of the common periwinkle *Littorina littorea* (Díaz et al. 2012). We have also studied the combined effects of overfishing (through meso-predator release) and nutrient enrichment on littoral communities and got some unexpected results compared to previous research (Kraufvelin and Christie, in prep.).

3. Introduced invertebrate species: Within this topic, we have recently examined stress tolerance levels of introduced species and compared the results with native species and found that the former are more tolerant to common stressors in the colonized areas. In a new set of experiments, we have also examined whether population specific tolerance towards abiotic stress can increase through stress-induced mortality (Lenz et al., in prep.).

4. Marine biodiversity and ecosystem functioning: These efforts mainly take place through international networking (GAME & MARBEF), either through common modular experiments or through the meta-analysis of existing data, where the central aim has been to evaluate the role of diversity for keeping up functional ecosystems. Most recently, we examined the temporal stability of European rocky shore assemblages, specifically looking at variation across a latitudinal gradient and the role of habitat-formers (Bulleri et al. 2012).

Eliecer Díaz takes sediment samples at a mussel farm in Kumlinge, Åland, in August 2012. Photo Patrik Kraufvelin

Eliecer Díaz carries out research in different marine benthic systems, i.e. intertidal as well as subtidal rocky shore and soft-bottom environments, mainly on mussel beds and algae-grazer interactions. The research can be divided into the following projects: 1. Effects of habitat loss and fragmentation on biodiversity and abundance of macrofauna in mussel beds in Finland, 2. Effects of cormorants on the benthic ecosystem (biodiversity, community metabolism and spatial patterns of invertebrates) and 3. Baltic EcoMussel (see pages 14-15).

Experimentell Klippstrandsekologi

Vi djupdyker i effekterna av stress som människan förorsakat genom att kombinera fältobservationer och experiment gjorda i mesokosmer och akvarier. Under året har arbete gjorts i Hangö, i Oslofjorden och inom världsomspännande nätverk (GAME och MARBEF)

”Blåstången i våra vatten reagerar på varma vårar med att vara tidigare i sin förökning, vilket kan leda till att den överrumplas av trådalger då ny blåstång skall fästa sig – vilket i sin tur kan ha följder för hur blåstången förekommer” (Kraufvelin et al. 2012).

”Den vanliga strandsnäckan påverkas av övergödning, dels genom att antalet snäckor ökar och dels genom att snäckans sätt att söka föda ändrar,
vilket påverkar dess samverkan med andra organismer (alger och djur) i strandzonen” (Diaz et al. 2012).

Collaboration

- BIOFUSE, Effects of biodiversity on the functioning and stability of marine ecosystems: European scale comparisons: project within the EU-network MARBEF (FP6) lead by Tasman Crowe from Dublin, Ireland and Lisandro Benedetti-Cecchi from Pisa, Italy. Co-operation network among 10 European Countries.
- Erik Bonsdorff, Jennifer Jungerstam, Annica Långnabba, Johanna Mattila, Tessa Mäki, Lina Mtwana Nordlund, Jens Perus, Sonja Salovius, Jörg Sareyka, Benjamin Weigel, Åbo Akademi University, Finland
- Hartvig Christie, Janne Kim Gitmark and Kjell Magnus Norderhaug, Norwegian Institute for Water Research, NIVA.
- Eliecer Díaz, Maria Ehrnström-Fuentes and Ann-Louise Erlund, Novia University of Applied Sciences, Ekenäs, Finland + the Baltic EcoMussel project team from Sweden and Latvia
- Johan Erlandsson, Vattenmyndigheten för Västerhavet, Länsstyrelsen i Västra Götalands län, Sweden
- Mark Lenz, Martin Wahl and Daniel Wohlgemuth, Leibniz-Institut für Meeres-wissenschaften, Kiel, Germany, + the entire GAME-team
- Magnus Lindström and Ari Ruuskanen, Tvärminne Zoological Station, Hanko, Finland
- Julia Nyström and Mats Westerbom, Metsähallitus, Ekenäs, Finland
- Morten Foldager Pedersen, Roskilde University, Denmark

Publications 2012

Kraufvelin, P., 2012. GAME – forska lokalt, tolka resultaten globalt. Finlands Natur 4:28-30. (In Swedish).

Kraufvelin, P., Ruuskanen, A. T, Bäck, S. & Russell, G. 2012. Increased seawater temperature and light during early springs accelerate receptacle growth of *Fucus vesiculosus* in the northern Baltic proper. Marine Biology 159:1795-1807.

Bulleri, F., Benedetti-Cecchi, L., Cusson, M., Maggi, E., Arenas, F., Aspden, R., Bertocci, I., Crowe, T. P., Davoult, D., Eriksson, B. K., Fraschetti, S., Golléty, C., Griffin, J. N., Jenkins, S. R., Kotta, J., Kraufvelin, P., Molis, M., Sousa Pinto, I., Terlizzi, A., Valdivia, N. & Paterson, D. M., 2012. Temporal stability of European rocky shore assemblages: variation across a latitudinal gradient and the role of habitat-formers. Oikos 121:1801-1809.

Díaz, E., Kraufvelin, P. & Erlandsson, J. 2012. Combining gut fluorescence technique and spatial analysis to determine *Littorina littorea* grazing dynamics in nutrient-enriched and nutrient-unenriched littoral mesocosms. Marine Biology 159:837-852.

The severity of the winter affects bladder-wrack reproduction
Photo Patrik Kraufvelin

Parental Care Strategies, Reproductive Success and Environmental Stress in Eiders

Markus Öst, Kim Jaatinen, Mikael Kilpi, Kristina Noreikienė & Martin Seltmann

Our research lies at the interface between fundamental research in evolutionary and behavioural ecology and more applied investigations into population dynamics and conservation biology. Despite different objectives, each subproject benefits from the others and from a unique twenty-year data set on eider ducks, our main study species, from Tvärminne, SW Finland.

Highlights of the year

We have done ground-breaking progress in understanding group formation under predation risk (Jaatinen & Öst, in press). A primary reason for animals to aggregate is predator dilution, the reduced chance of an individual to be targeted by a predator. However, groups are not always formed by solitary adult animals, but also by the merger of smaller groups, such as families, a fact that has been overlooked. When such sub-groups merge, the sub-group in minority enjoys more safety than the sub-group in majority. Because of this, the willingness of a sub-group to merge with others should increase the less it contributes to total group size. The conflicting preferences of partners may, however, result in the preferential merger of similar-sized sub-groups. We predicted that i) size-matched sub-groups should have a higher propensity to merge, ii) predation should increase group formation propensity, and that iii) increased ability to withstand the strains of solo care, as described by female body condition, should increase choosiness and thus the time needed to establish partnerships. We tested these predictions in eiders, in which different-sized broods may fuse together, forming larger brood-rearing groups. Our data supported all predictions. Thus, animals seeking safety may 'negotiate' by striving towards consensus regarding their relative benefits of grouping together. Individuals can actively assess their own family size in relation to others', a so far unknown capability.

The head dimensions of females were measured as part of a pilot project investigating whether big-headed females are more clever and thus enjoy higher reproductive success. Photo Heikki Eriksson

We have also studied personality variation and its links to individual quality (Seltmann et al. 2012). Consistent individual differences in boldness towards predators are common, but the causes remain contentious. We measured boldness as flight initiation distance (FID), the distance at which an incubating female eider fled from an approaching investigator. Females with high stress-induced corticosterone levels were less bold as indicated by their longer FIDs. However, high stress responsiveness was associated with shyness only in younger females. Furthermore, for a given level of stress-induced corticosterone, females in good body condition were bolder than those in poor condition. Shy females also had a shorter incubation period, which may have fitness consequences, because the length of embryonic development affects offspring quality. To conclude, physiological stress effects on boldness cannot be understood in isolation from effects of individual quality.

We have also shown that the relationship between relatedness and cooperation is complex in eiders (Jaatinen et

Individual marking provides a wealth of information. This female from northeastern Gisselgrund is as eager as always to leave our company, despite being captured by us every year since 2009.
Photo Heikki Eriksson

Ungomvårdnadsstrategier, häckningsframgång och miljöstress hos ejdern

Ungvård, reproduktion och omgivningsstress hos ejder studerar vi i Tvärminne, Hangö. Forskningen startade redan 1990 och har gett upphov till en fin tidsserie med många möjligheter.

”Varför ejderkullar slår ihop sig till större grupper är en grundfråga i vår forskning – och nu har vi visat en helt ny sida av det hela, nämligen att honor kan bedöma storleken på sin egen ungflock i förhållande till andra kullar, och använda den informationen då det gör beslut om sammanslagningar” (Jaatinen och Öst 2013).

”Det att ejderhonor är olika till sitt lynne vet vi, men nu kan vi också mäta detta, och se om det med för nackdelar eller fördelar av att vara skygg eller framfusig” (Seltmann et al. 2012).

”Tyvärr minskar ejdern i Hangövattnen mycket snabbt, vilket till stor del kan förklaras av att dödligheten bland honorna ökat kraftigt” (Ekroos et al. 2012).

al. 2012). The relatedness between females in brood-rearing coalitions was higher in groups with fewer females. However, in most years, this kin association arises as a passive by-product of demography and age-dependent partner choice, because older females prefer smaller groups and the proportion of relatives encountered by a female increases with advancing age.

We have also investigated the population dynamics of Baltic eiders in the face of environmental change (Ekroos et al. 2012 a & b). The survival of eider females in Tvärminne was the lowest ever recorded for any eider population, and the survival was particularly low on open islands frequented by hunting white-tailed sea eagles. This may be a factor contributing to the 40% decline of eiders over the entire Baltic/Wadden Sea flyway.

Current collaborators

- Hanna Kokko & Jussi Lehtonen, Australian National University
- Keith Hobson, University of Saskatchewan, Australia
- Ronald C. Ydenberg, Simon Fraser University, Canada
- Anthony D. Fox & Karsten Laursen, National Environmental Research Institute, Denmark
- Aleksi Lehikoinen, Finnish Museum of Natural History, Finland
- Martti Hario & Hannu Pöysä, Finnish Game and Fisheries Research Institute, Finland
- Juha Merilä, University of Helsinki, Finland
- Phillip Gienapp, University of Helsinki, Finland
- Anette Fenstad, University of Trondheim, Norway
- Børge Moe, Jan Ove Bustnes & Sveinn Are Hanssen, Norsk institutt for naturforskning, Norway
- Kjell Larsson & Peter Waldeck, Gotland University, Sweden
- David Costantini & Pat Monaghan, University of Glasgow, UK
- Benjamin B. Steele, Colby-Sawyer College, USA
- Kendall Mashburn & Shannon Atkinson, University of Alaska Fairbanks, Fisheries Division, USA
- Tuula Hollmén, Alaska SeaLife Center, University of Alaska, USA

Publications 2012

Ekroos, J., Fox, A. D., Christensen, T. K., Petersen, I. K., Kilpi, M., Jónsson, J. E., Green, M., Laursen, K., Cervencl, A., Boer, P., Nilsson, L., Meissner, W., Garthe, S. & Öst, M. 2012a. Declines amongst breeding eider *Somateria mollissima* numbers in the Baltic/Wadden Sea flyway. Ornis Fennica 89: 81-90.

Ekroos, J., Öst, M., Karell, P., Jaatinen, K. & Kilpi, M. 2012b. Philopatric predisposition to predation-induced ecological traps: habitat-dependent mortality of breeding eiders. Oecologia 170: 979-986.

Jaatinen, K. & Öst, M.: Brood size matching: a novel perspective on predator dilution. American Naturalist, *in press*.

Jaatinen, K., Noreikienė, K., Merilä, J. & Öst, M. 2012. Kin association during brood care in a facultatively social bird: active discrimination or byproduct of partner choice and demography? Molecular Ecology 21: 3341-3351.

Jaatinen, K., Öst, M., Gienapp, P. & Merilä, J. Facultative sex allocation and sex-specific offspring survival in Barrow´s goldeneyes. Ethology, *in press*.

Seltmann, M. W., Öst, M., Jaatinen, K., Atkinson, S., Mashburn, K. & Hollmén, T. 2012. Stress responsiveness, age and body condition interactively affect flight initiation distance in breeding female eiders. Animal Behaviour 84: 889-896.

An eider data factory. Kristina takes a blood smear to check for the presence of parasites, Kimi equips the female with colour rings and Markus mainly enjoys the sunshine. Photo Heikki Eriksson

Associate Researcher

Evolutionary Dynamics of Colour Polymorphism and Mechanisms of Selection

Patrik Karell

The project aims at understanding proximate mechanisms of natural selection, life-history trade-offs and genotype-environment interactions.

Highlights of the year

The focus of the project has in 2012 been to investigate the mechanisms by which colour polymorphism is maintained and altered in natural populations. In the model system – tawny owls – individuals vary in colour ranging from pale grey to reddish brown.

Recently, we showed based on survival analyses on the long-term individual based data on tawny owl colour morphs that survival of the brown morph is markedly lower than that of the grey morph in cold and snow-rich winters (Karell et al. 2011a). Based on theory and previous studies we believe one potential cause for lower survival probability in the brown morph in harsh winters is that it has greater energy requirements than the grey one. Using individual based data on flight feather moult from 1985-2010 collected in Västra Nyland we analysed to which extent the colour morphs shed their flight feathers under variable food (vole) conditions (Karell et al. in press). Moult of flight feathers is important in birds since it improves their flight performance, yet on the other hand it is a resource demanding and time consuming event. Larger birds, such as the tawny owl, therefore only moult part of their flight feathers every year. We showed that the brown tawny owl morph consistently moulted more primary flight feathers than the grey morph irrespective of whether food conditions were good or bad (Fig. 1). This implies that brown tawny owls invest more time and energy in moult compared to the grey ones, which may result in less fat reserves for the brown owls in harsh winters when voles are difficult to access under the snow. The reason for why the brown morph moults more flight feathers than the grey one is still to be resolved, but is likely to be due to either a more active life style which wears out the feathers, or due to a higher metabolic rate which leads to a faster exchange of feathers. The observed differences in the extension of moult improve our understanding of how colour morphs are adapted to different environmental conditions.

I have spent time in Lund University in Sweden where I have, together with my collaborator prof. Staffan Bensch, developed and optimised a quantitative real-time PCR method to investigate blood parasitemia from tawny owl blood samples. Our previous study has shown that these blood parasites have different impact on the body condition of the tawny owl colour morphs (Karell et al. 2011b).

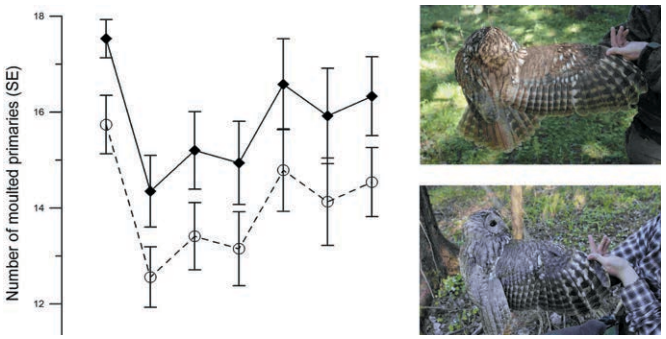


Figure 1. Age dependent effects on the number of moulted primary flight feathers in grey (open circles, dashed line) and brown ((filled diamonds, solid line) tawny owls. The brown morph consistently moult more feathers than the grey one (redrawn from Karell et al. In press). Pictures of brown (upper) and grey (lower) tawny owl taken by Mikko Honkiniemi.

My aim with this new PCR based blood parasite quantification method is to have a straightforward and reliable method to study the long-term impact of parasites as mediators of natural selection (survival and fecundity).

I have also started new collaboration with Dr. Ismael Galván in Unversité Paris-Sud (France) who is measuring antioxidants and oxidative damage levels in feathers and blood I have collected from tawny owl colour morphs this year. We predict there are genetic differences in oxidative stress tolerance between morphs.

Publications 2012

Karell, P., Brommer, J.E., Ahola, K. & Karstinen, T. Brown tawny owls moult more flight feathers than grey ones. Journal of Avian Biology, In Press.

Ekroos, J., Öst, M., Karell, P., Jaatinen, K. & Kilpi, M. 2012. Philopatry predisposes to predation-induced ecological traps: habitat-dependent mortality of breeding eiders. Oecologia, DOI 10.1007/s00442-012-2378-9.

Current collaborators

- Prof. Staffan Bensch & prof. Jan-Åke Nilsson, Lund University, Sweden
- Prof. Jon E. Brommer, University of Turku, Finland
- Prof. Anders P. Møller & Dr. Ismael Galván, Université Paris-Sud, France
- Prof. Xavier Lambin, University of Aberdeen, UK
- Dr. Jari Valkama, University of Helsinki, Finland

Evolutionsdynamik som styr färgdimorfism

Hur upprätthålls och förändras förekomsten av färgmorfer av en och samma art- och vilka är urvalsprocesserna? Projektet arbetar med att förstå mekanismer bakom naturligt urval med kattugglan som modellorganism – en art med två färgtyper, en brun och en grå.

”Bruna kattugglor byter alltid fler vingpennor per säsong än de grå, vilket vi kan visa i en västnylandsk population som vi följt med sedan 1985. De bruna satsar alltså mer energi på att rugga än de grå, och det kan hända att den satsningen inte är bra ifall vintrarna är kalla, då också de grå klarat sig betydligt bättre” (Karell et al. 2013, i tryck)

“Blodparasiter påverkar också gråa och bruna kattugglor på olika sätt - via effekter på kroppskondition. Därför satsar vi på att hitta nya, effektiva molekylära metoder för att kunna mäta parasitförekomst i blodprov av ugglorna”.

Decomposition of Organic Material Through the Photochemical Processes in the Aquatic Ecosystems

Anssi Vähätalo

The main research theme of the group is solar radiation induced photochemistry in the aquatic systems, but some of the research is related to birds also.

The group is developing and applying photochemical models to provide perspectives into biogeochemistry of natural and anthropogenic substances. The group has close and active research links with several laboratories in Finland and abroad. The main research themes of Vähätalo are: 1) The role of dissolved organic matter for the functioning of aquatic ecosystems 2) The photochemical transformation of natural organic matter in surface waters 3) The solar photolysis of harmful anthropogenic organic chemicals in the environment 4) The optical properties of surface waters and sea ice and 5) The impact of climatic warming on (aquatic) birds.

Anssi Vähätalo was appointed lecturer in environmental science at Jyväskylä University from August 2012.

Nedbrytning av organiskt material genom fotokemiska processer i akvatiska ekosystem

Nedbrytning av organiskt material genom fotokemiska processer i akvatiska ekosystem är huvudtemat för oss. De fotokemiska processerna betyder i praktiken solljus, och solljuset har en synnerligen viktig roll när det gäller nedbrytning av organiskt material som förs ut från sött vatten till havet.

”Sådana processer har vi senast undersökt på en skala som omfattade hela Östersjön” (Aarnos et al. 2012).

Anssi Vähätalo flyttade till Jyväskylä Universitet som universitetslektor i augusti 2012.

Publications 2012

Aarnos, H., Ylöstalo, P. & Vähätalo, A. V. 2012. Seasonal phototransformation of dissolved organic matter to ammonium, dissolved inorganic carbon and labile substrates supporting bacterial biomass across the Baltic Sea. Journal of Geophysical Research 117, G01004

Vaalgamaa, S. & Vähätalo, A. Oönskat världsarv i våra vatten. Finlands Natur 2, s. 12-13.

Anssi Vähätalo. Photo Kajsa Mellbrand

Baltic EcoMussel

Eliecer Díaz, Ann-Louise Erlund & Patrik Kraufvelin

The worldwide decline of ocean fishery has provided impetus for rapid growth in fish and shellfish farming. The causes why fishery is declining in Finland are largely associated to the increase in eutrophication. Baltic EcoMussel project presents a natural method/solution to recycle nutrients and improve the oxygen dissolved in the water by increasing the abundances of blue mussels, *Mytilus edulis*, through mussel farming. The project aims to help to accelerate the implementation of mussel farming in the Baltic Sea Region by providing information about its impacts and benefits for the environment and tools to support investments.

Highlights of the year

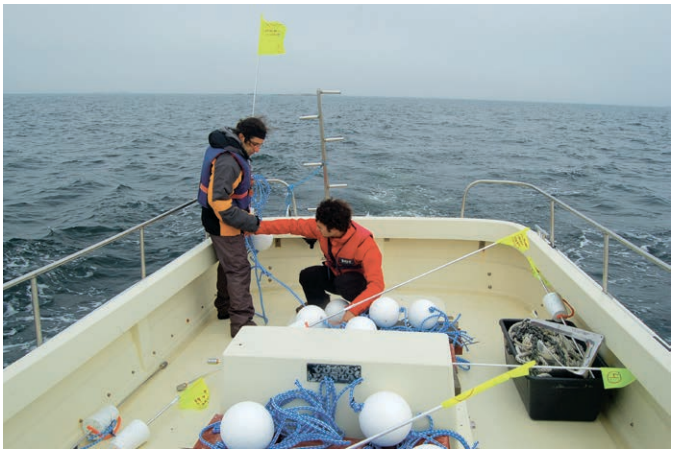
Mussels feed on plankton, which incorporate nutrients dissolved in the sea, therefore mussels improve the water transparency and the process of harvesting mussels removes nutrients from the sea. The mussels can be used for biogas production, as natural fertilizers or converted into food for fish and animals. The way we proposed to use the mussel farms implies that no more nutrients are added to the aquatic ecosystem and the nutrient cycle/loop in the system is closed.

The project started in spring 2012. Since then stakeholder meetings and study trips have been arranged, and newsletters, brochures and other information material have been published. The project aims to achieve a commercially-viable mussel economy in the Baltic Sea region by providing key stakeholders with the tools needed for mussel farming. This includes assessment of regulatory conditions and developing guidelines and business plans for mussel farmers; assessment of market potential and socio-economic impacts of large-scale farming; establishing methodologies and routines for monitoring and evaluation of farms and gathering, informing and training key stakeholders from the research community, aquaculture and end-user groups.

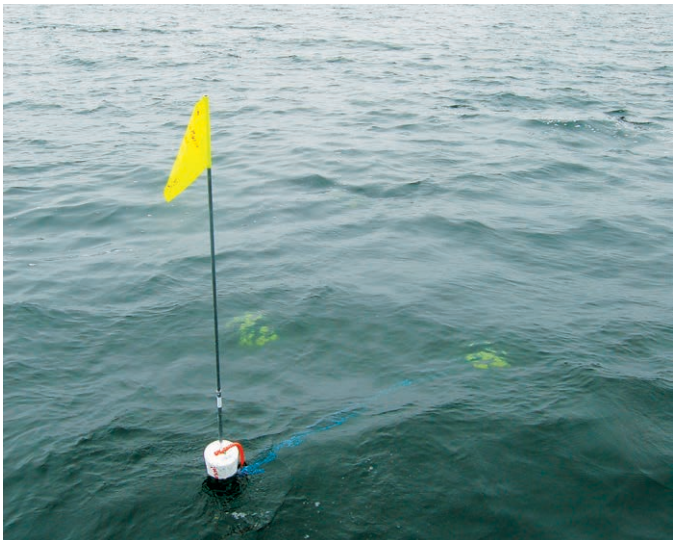
Group meeting in Latvia. Front row: Ann-Louise Erlund, Ligita Laipeniece, Carl Hamilton, Zaiga Ozolina. Back row: Joakim Svensson, Sarmite Barbale, Mats Emilsson, Eliecer Díaz

The project is financed by Central Baltic “INTERREG IV A Programme 2007-2013”

Project leader Eliecer Díaz and assistant Daniel Wolgemuth are setting up the pilot experiment to assess the recruitment and growing of mussels in the Hanko area in early June 2012.



One of the 27 experimental units in the Hanko area



Baltic EcoMussel

Vi vet att blåmusslan är en mycket effektiv filtrerare av havsvatten. Därför har det redan en tid pågått försök att utnyttja blåmusslan som vattenrenare på olika håll i Östersjön. I Baltic EcoMussel frågar vi oss om det är möjligt att också använda musselkött som foder eller biobränsle eller musselskal som gödsel – kanske också hitta andra innovativa lösningar för musslor som först tagits fram från musselodlingar vid lokaler där man vill ha en förbättring i vattenkvaliteten. Utmaningarna i Östersjön är många – och projektet söker lösningar.

Project partners

- East Sweden Energy Agency (Sweden) - Lead Partner
- Novia University of Applied Sciences (Finland)
- The Latvian Environmental Investment Fund (Latvia)
- Kurzeme Planning Region (Latvia)

Group meeting in Sweden. Mats Emilsson showing to Eliecer Diaz the recruitment of mussels in the east coast of Sweden.

Mussel farmers from Sweden harvesting mussels using high water pressure method.

Outputs:

- Poster “Eco-forecasting: Mussel farms towards environmental sustainability in the Baltic Sea”
- Presentation “Eco-forecasting: Mussel farms towards environmental sustainability in the Baltic Sea part II”
- Newsletter: Baltic EcoMussel: Project group and Stakeholder meeting in Finland
- Brochure: Baltic EcoMussel
- Stakeholdermeeting at Novia Campus Raseborg, November 27th

Baltic MusselEco

CENTRAL BALTIC INTERREG IV A PROGRAMME 2007–2013

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Bra Mat i Västnyland

Ann-Louise Erlund, Jenny Öhman, Pieter Deleu, Traci Birge & Marianne Fred

Bra Mat i Västnyland's aim is to create networks to facilitate a more effective production of local foods, stimulate product development of local foods and improve the distribution of local foods in the region. The project started in September 2011 and will continue until the end of June 2014.

Highlights of the year

In 2012 several seminars were arranged with topics how to increase knowledge about regulations in the food Act and hygiene, how to promote the visibility of the primary producers themselves and how to improve information about the origin of food produced in the region. Sheep farming is increasing in Western Uusimaa and discussions about how to develop this activity have been continuing with sheep farmers. The demand of sheep products is significant and due to this an workshop about processing sheep and beef meat was arranged in June at Åminnegård.

The audience at the Egenkontrollplan -discussion occasion in November. Photo Jenny Öhman

The Project team was involved in Food festival of 2012 – "Smaka på Västnyland" (taste of western Uusimaa) which was arranged at Westerby Gård, Ingå. The project had a stand where some ecosystem services where visualized using examples such as water purification, composting, pollination and nitrogen sequestration.

The team was also contributing to the "Närmatskatalog", an information booklet about local entrepeneurs and products, and especially the visual information connected to the map where people can get information about where the farms and enterprises can be found. Information about summer markets and markets (open round the year) were included, because they are an important sales

Some of the Producer´s stands at the food festival "Smaka på Västnyland" in September at Westerby Gård. Photo Jenny Öhman

Bra Mat i Västnyland

Bra mat handlar om mat, förstås! I Bra Mat tycker vi att det som är bra mat är närproducerat, ekologiskt hållbart och gott. Det tror vi att många konsumenter också tycker, men hur skall vi lyckas med att få producent och konsument närmare varandra? Bra mat finns, och det har blivit lättare att hitta i nya nätverk som skapats, och via mer effektiv info. För att testa det bästa av det goda finns också numera ett försökskök på Västankvarn Gård, där man också kan experimentera med olika sätt att få Bra Mat ännu bättre!

channel for producers selling their products to summer-guests and boaters who want to buy fresh fish and vegetables in remote areas of the region.

During the summer the project visited the summer markets in the region to look at the range of locally produced food, which resulted in an article with the same topic in the local newspaper Västra Nyland. Earlier in the year an article about the significance of different labels on food products was published in the same newspaper and in Marthabladet.

A new test-kitchen was established at Västankvarn Gård. People who are interested in food processing and need approved facilities have now the opportunity to rent this kitchen. This will hopefully increase the interest of processing food in the region. See also the project website at : http://bramativastnyland.novia.fi/ or find us on facebook under the name Bra Mat i Västnyland.

Outputs

Publications

- Jenny Öhman. Hitta rätt märkning. Västra Nyland 22.5.2012
- Pieter Deleu & Jenny Öhman. Sommartorgen lockar med lokalt. Västra Nyland 11.8.2012
- Ann-Louise Erlund: Bra närmat i Västnyland. Västra Nyland 1.2.2012.
- Närmatskatalog 2012-2013 (editing)

Newsletters

- Bra Mat Nyhetsbrev I, II & III
- Infobrev till fårfarmare

Workshops & Seminars

- Diskussionstillfälle om Livsmedelslagen (352/2011), January 26th
- Seminarium - Vad är en bra måltid?, March 24th
- Seminarium I del I - Inga bra lösningar utan bra problem, March 27th
- Seminarium I del II - Inga bra lösningar utan bra problem, April 11th
- Mångsidig mat-tillfälle I, June 6th
- Diskussionstillfälle om Egenkontrollplan, November 1st
- Diskussionstillfälle om Upphandlingslagen, November 8ht

Collaborators

- Ecosystem Service Research group
- Slow Food

Pontus Berglund at Restaurant Åminnegård is preparing some smoked sheep hearts at the workshop in June. Photo Jenny Öhman

Climate and Greenhouse Gases – the Local Point of View

Tiina Haaspuro

This project entity covers two different subprojects concerning climate issues on a local level. The subproject 1 concentrates on developing calculation methods for the effect of greenhouse gas sinks on a local level to evaluate how much carbon is sequestered in the carbon sinks and to create a calculation model for that purpose. The subproject 2 developed an energy and climate programme for the Town of Raasepori.

Highlights of the year

The project Carbon sinks in local environments has managed to develop calculation methods for the effect of greenhouse gas sinks on a local level (municipalities) to evaluate how much carbon is sequestered in / emitted from the carbon sinks. The calculations have been compiled in a calculation model form. All the coefficients and parameters needed for calculations are included in the model and the user only needs to fill in some basic data about the size and extent of the natural areas in the municipality in question. The calculation methods were planned in cooperation with experts on fields of emission calculations and carbon dynamics in ecosystems. Carbon sequestration and emissions from forests and agricultural soils are a part of Finland's national emission inventory that is reported to the UNFCCC and the European commission. Therefore, the existing national level calculation methods were applied in this work for forests and agricultural soils so that they were adapted for use on a local level. One basis for developing the methods was that the model needs to be easy to use and the data needed for calculations easily available, which means that the methods needed to be simplified to fit that requirement. For the natural environments that aren't included in the national emission calculations, e.g. lakes and mires, the calculations are based on the most accurate research findings available.

Carbon sinks have an important role in the terrestrial greenhouse gas balance. Photo Tiina Haaspuro

Fresh waters function as small greenhouse gas sinks through C accumulation and sedimentation, but are at the same time substantial sources of methane. Photo Tiina Haaspuro

The calculation methods and the calculation model were tested within the project. Henna Timonen, a student of

Klimat och växthusgaser - det lokala perspektivet

Det lokala perspektivet på klimat och växthusgaser jobbar med en kalkyleringsmodell för vart utsläpp av växthusgaser tar vägen – hur mycket binds upp och hur mycket går ut i atmosfären genom s.k. kolsänkor på lokal nivå. På en nationell skala beaktar modellerna inte t.ex hur mycket som binds upp av sjöar och våtmarker, och det försöker vi ta fram. Och allt detta skall leda till modeller och beräkningsgrunder som är lätta att förstå och att använda.

Det lokala perspektivet omfattar också kommunen Raseborgs, och för kommunen tog vi fram ett energi- och klimatprogram och en handbok för var och en som vill göra sin energianvändning mera effektiv

Novia University of applied sciences (environmental planning), was employed in the project for two months for that purpose. Her task was to gather the information needed for the calculations and to feed the data in to the model, to evaluate the model from a user perspective and create a carbon balance for the eight municipalities that formed the test area. The test results will be presented in her thesis. The calculation model was developed further based on the results of the test.

The subproject Development of an energy and climate programme for the Town of Raseborg was successfully accomplished in the beginning of 2012. We produced an energy and climate program including handbooks for every sector in the municipality, suggesting which measures where needed per sector to reduce energy use and emissions. A handbook for laymen willing to reduce their personal energy use was also produced. Raseborg as a town started to implement the programme immediately.

Collaborators

- Prof. Rainer Backman, University of Umeå, Sweden
- Senior Researcher Tarja Tuomainen, Finnish Forest Research Institute / Greenhouse gases estimation and reporting
- Town of Raseborg

Publications 2012

Kurkisuo, M. & Haaspuro, T. 2012. Raseborgs stads energi- och klimatprogram / Raaseporin kaupungin energia- ja ilmasto-ohjelma. Energy and climate program report. Town of Raseborg.

Kurkisuo, M. & Haaspuro, T. 2012. Raseborgs stads energi- och klimatprogram / Raaseporin kaupungin energia- ja ilmasto-ohjelma. Brochure (overview of the program). Town of Raseborg.

Kurkisuo, M. & Haaspuro, T. 2012. Raseborgs stads energi- och klimatprogram / Raaseporin kaupungin energia- ja ilmasto-ohjelma. Invånarnas energispartips / Asukkaiden vinkit. An energy and climate guide for inhabitants. Town of Raseborg.

Forests are an important carbon sink. They sequester carbon through growth. Photo Tiina Haaspuro

GREEN ISLANDS

Kaj Mattsson, Marianne Fred, Rolf Holmberg & Kajsa Mellbrand

The Green Islands –project's (Central Baltic Interreg IV project, 2011-2013) main goal is to improve environmental conditions in the Baltic Sea region. The project aims at achieving "greener" islands by mapping, analyzing and evaluating the situation in terms of how solid waste is taken care of, energy and water consumption, wastewater management and ecosystem services on participating islands in Sweden, Finland and Estonia. The Finnish islands participating are Vänö, Iniö, Skåldö and Högsåra, the Swedish islands are Utö, Ornö, Askö. Ingmarsö, Ramsö and Tynningö and the Estonian island is Muhu.

Highlights of the year

Rolf Holmberg was recruited in January and he started working in February 2012. His job is to develop a model to estimate greenhouse gas emissions on the islands in Sweden, Finland and Estonia participating in the Green Islands project.

In February Green Islands had a project meeting in Stockholm where all members from Sweden, Finland and Estonia participated. Green Islands discussed with Pargas Municipality about a possibility and funding of replacing existing roadlights with LED-lamps. First meeting was on Keistiö island at July 24th. The city of Pargas paid for new lamps, now in operation.

Project Manager Kaj Mattsson, Gustav Munsterhjelm from Raseborg municipality and consultant Esko Vuorinen are checking potential excursion sites for a Green Islands wastewater seminar in may 2012. Photo Kajsa Mellbrand

Wastewater excursion in Ekenäs May 8.-9.th. Photo Rolf Holmberg

Green Islands

Gröna öar i havets famn är fokusområden i Green Islands. Det handlar om att gröna öar skall vara gröna, och de kan bli ännu mer gröna ifall vi lyckas hitta innovativa lösningar på det lokala planet. Kan vi lösa avloppsfrågor bättre, eller kan vi fixa bättre energilösningar, och kan vi minska koldioxidutsläpp på ett smart sätt i riktigt liten skala? Med i projektet är större och mindre öar – klassiker som svenska Utö och andra idylliska hamnar i Finland och Estland.

Workshops and seminars

- Energy workshop in Keistiö, Iniö March 26th.
- Wastewater seminar and excursion at Novia in Ekenäs. Participants from Sweden, Estonia and Finland, May 8.-9th.
- Energy Workshop in Iniö June 1st.
- Energy and wastewater workshop in Norrby, Iniö, on July 12th.
- Workshop at Novia, Ekenäs; presentation of Onewell water cleaning and reuse device, a fully ecological system, September 7th,.
- Workshop in Keistiö, Iniö, September 10th
- Workshop in Pargas on Cleaning and reuse of wastewater, November 14th

Happy outdoor pigs on Ornö island in Sweden. Photo Kajsa Mellbrand

Photo Rolf Holmberg

Project Partners

- The Archipelago Foundation in the county of Stockholm, Sweden
- Association of Estonian Islands (AEI)
- Novia University of Applied Sciences, Finland
- Sustainable Saaremaa, Estonia

Green Islands Baltic Sea

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NANNUT – Nature and Nurture of the Northern Baltic Sea

Sonja Jaari, Mikael Kilpi & Jill Rehnman

The NANNUT project (Central Baltic Interreg IVA) integrates the usage of underwater information in the planning of human activities in marine shallow areas.

Highlights of the year

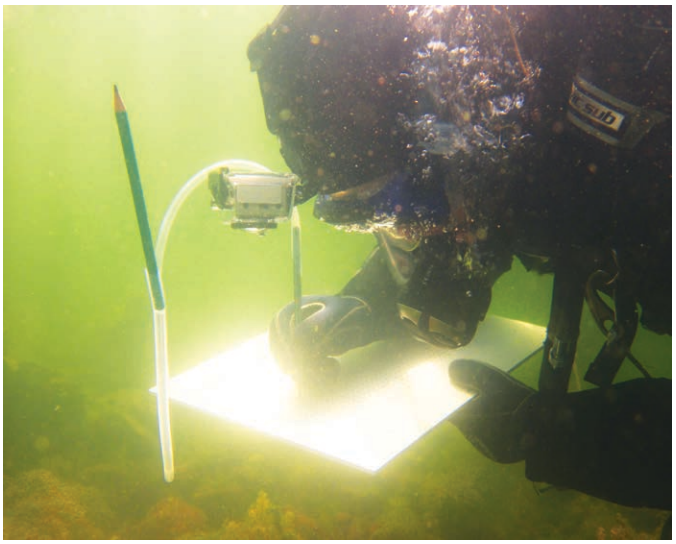
This has been the final year of NANNUT. A lot of the work has been disseminating the results and reporting to the financers. Within NANNUT we have arranged a seminar tour – a roadshow to 6 different locations in mainland Finland, Åland and Sweden. Furthermore we have arranged a joint seminar with SYKE (The Finnish Environmental Institute) dealing with underwater inventory methodology. Within the project we have produced a movie concerning the underwater environment, the film has been distributed on DVD (1000 copies) and on the internet (viewed more than 2300 times). Furthermore, we have published several brochures and report, during the final year. The data collected in the project is freely available on the map portal established within the project (www.nannut.fi) furthermore it has been shared with the Town of Raseborg to ensure it will be available for the planning use in the future.

NANNUT won the "Bouncing Float Award Contest"-for the best picture on Central Baltic Interreg IVA-projects in 2012!

At stakeholder meetings, we successfully used a "learning-cafe" approach to get people to work together! Photo Malin Ek

Project partners

- Aronia, Novia University of Applied Sciences
- Centre for Economic Development Transport and the Environment for Southwest Finland
- Metsähallitus, Natural Heritage Services
- Government of Åland
- Stockholm University
- Finnish Game and Research Institute
- Centre for Economic Development Transport and the Environment for Southeast Finland
- Lounaispaikka/Regional Council of Southwest Finland
- Centre for Economic Development Transport and the Environment for Uusimaa
- University of Turku/ Centre of Maritime Studies



NANNUT won the "Bouncing Float Award Contest"-for the best picture on Central Baltic Interreg IVA-projects in 2012! Photo Malin Ek

NANNUT

NANNUT var ett projekt som tog fasta på att även om det möjligen finns information om naturvärden under havsytan i våra kustvatten, så är de sällan i den formen att de lätt kan användas i planering. I NANNUT ville vi verkligen nå ut till den kommunala förvaltningen, och det vi fick tillbaka var en överväldigande respons om hur behövligt det vore att veta mer om undervattensnatur! Vi vet alldeles för litet, och kan kanske inte heller förvalta undervattensnatur på bästa vis. Det blev också tydligt att det som är gömt kan lätt bli glömt vid planering.

The Bladder wrack is one of the few significant key species in the northern Baltic Sea – hence, it is on the cover of the NANNUT film. Photo Malin Ek

NANNUT
Nature and Nurture
of the Northern Baltic Sea 2010-2012

CENTRAL BALTIC
INTERREG IV A
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Outputs

Movie

- DVD – Under Ytan, Pinnan alla, Below the surface (long (43 min) and short (21 min) version)

Reports

- Pohjois-Itämeren vedenalainen luonto - Huomioon otettava merenläheisten alueiden suunnittelussa - Cecilia Lundberg et. al (08-2012)
- Undervattensmiljö i norra Östersjön - Viktigt att tänka på vid havsnära planering. - Cecilia Lundberg et al. (08-2012)
- Menetelmäohjeisto rannikon taloudellisesti hyödyntämättömien kalalajien lisääntymis- ja esiintymisalueiden kartoittamiseen - Janica Borg et. al (05-2012)
- Benthic vegetation in shallow inlets of the Baltic Sea - Joakim P. Hansen (04-2012)
- Satamat ja vedenalainen luonto - Jenni Storgård et. al. (03-2012)

Brochures

- Öljyvuodon vaikutukset Itämeren luontoon / Effekter av oljeutsläpp på Östersjöns natur / The effect of oil spills on the nature of the Baltic Sea (published together with the Oilrisk project)
- Hamnar och havsmiljön / Satamat ja meriympäristö
- Merenpinnanalainen luonto / Naturen under havsytan
- Organismsamhällen på havets botten / Rannikon läheiset merenpohjan eliöyhteisöt

Seminars and workshops

- Vedenalaisen meriluonnon kartoitus seminaari VELMU:n menetelmäohjeisuksesta (Helsinki) 3. 2. 2012
- Roadshow Kotka (Sokos Hotel Seurahuone, Keskuskatu 21, Kotka), March 5th
- Roadshow Helsinki (Ravintola Pääposti, Mannerheiminaukio 1B, Helsinki), March 7th
- Roadshow Tammisaari (Tammisaaren luontokeskus (Tammisaaren luontokeskus, Rantapuistikko, Tammisaari), March 8th
- Roadshow Turku (Ruissalon kylpylä), March 9th
- Roadshow Mariehamn (Ålands landskapsregering), March 14th
- Roadshow Stockholm (Länsstyrelsen in Stockholms län), March 16th

BACES -Baltic Archipelago and Islands Centres

Ann-Louise Erlund & Mikael Kilpi

BACES is a cooperation project between 11 partners from Sweden, Finland and Estonia wanting to share ideas and strategies in how to develop their BACES as assets for regional development.

Highlights of the year

In the year 2012 seminars, networking, marketing and information has been in focus in addition to measures which have been implemented in every BACES area. All BACES workgroups have been dealing with marketing and information about the activities.

A three day seminar was arranged in Raseborg in May 2012. The first day of the program was planned for entrepreneurs from all BACES areas. The theme of the seminar was "local food" and food processing and discussions about common issues concerning the theme. Study visits were also included to the program, and the participants visited some enterprises in Raseborg. Approximately 50 persons participated to the seminar.

Another seminar was arranged for entepreneurs in Hanko and Raseborg in November. The topic was Good Customer Service – Increased incomes. About 25 entrepreneurs participated in the seminar. The seminar was arranged in cooperation with the Towns of Hanko and Raseborg.

Each country has done their particular practical bits of the project, including exhibitions, leaflets and information stands.

Project Partners

- Östsam Regional Development Council, Sweden
- Norrköping Municipality, Sweden
- Söderköping Municipality
- Valdemarsvik Municipality, Sweden
- County Administrative Board of Östergötland, Sweden
- Municipality of Söderhamn/Culture and development department, Sweden
- Eurohouse NGO, Estonia
- Foundation Tuuru, Estonia
- Aronia, Novia University of Applied Sciences, Finland
- Municipality of Hanko, Finland
- Town of Raseborg, Finland

Seminars & wokrshops

- BACES – project seminar in Raseborg 22 – 25th of May and the first day with topic - Local Food Cooperation in Western Uusimaa and Uusimaa. The two other days were BACES – seminar
- Good Customer Service – Increased incomes, seminar, 12th of November.

A Finnish version of a light infrastructure for camping outdoors – a "laavu" at one of the BACES-sites, Gunnarsören Island in Hanko. Photo Mikael Kilpi

EUROPEAN UNION
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INVESTING IN YOUR FUTURE

CENTRAL BALTIC INTERREG IV A PROGRAMME 2007–2013

BACES

BACES (=noder i en Östersjöskärgård) vill föra fram värdefull natur i skärgården på ett sätt som dels skall öppna ögonen för nya områden dit man kan ta sig på egen köl, och också göra fin natur mer lätt att nå. BACES förenar förnäm svensk Ostkustskärgård med västra Finska Viken och den gamla svenskbygden vid den estniska kusten. I regionen kör vi fram pärlor som Jussarö i Raseborg, Gäddtarmen och Gunnarsörarna i Hangö. BACES vill också främja hållbart småskaligt företagande i skärgården.

Geodesign

Romi Rancken, Johanna Kollin & Georgy Rybakov

The project started in April 2012 and aims at developing and implementing new ways of planning of natural resources and urban areas based on the concept of geodesign. This concept is strongly rooted in GIS but also incorporates methods from landscape planning, computer visualization and participatory approaches. The project is managed by Romi Rancken.

Highlights of the year

During 2012 emphasis has been put on development of techniques for producing high resolution aerial images and 3D models of landscapes as a basis for interactive planning. A fixed-wing UAV has been used with great results, and a multi-rotor microcopter has been built for field testing in 2013. A separate project for the development of UAV techniques, including image analysis, started from the beginning of year 2013. This sub-project is managed by Georgy Rybakov, student from the DP ICZM.

At the end of the year project worker Johanna Kollin tested and developed a manual for a computer program for geodesign, CommunityViz. The program will be used for interactive what-if-analyses.

Romi Rancken and Georgy Rybakov training with a UAV together with Nigel King, developer of the aircraft. Photo Jonathan Kellagher

3D model of a farm, based on 2D imagery.

Efforts to involve the Town of Raseborg in the project have been successful, and the cooperation with the environmental office and the city planning office is regular and growing.

The project is funded by Finlandssvenska Jordfonden.

Image of Västankvarn training farm taken from an altitude of 140 meters. The image is a mosaic based on about 100 individual photos.

Geodesign

Geodesign lyfte på våren 2012 med utveckling av teknik för fotografering från obemannade små flygplan. Drönare som också används i spionsyfte kan få en roll som ett sätt att plocka ner bilder av vår omvärld som vi kan förädla i geografiska informationssystem och använda för planering. Men Geodesign handlar också om att föra ut information på ett nytt sätt, bättre och effektivare, för att öppna upp för en mer meningsfull planering av områden i dialog mellan folk och t.ex. kommunala beslutsfattare. Därför finns också andra bitar inbakade i Geodesign, som utveckling av program som kanske kan användas ihop med bilder i en dialog där man frågar sig om-vi-gör-så, vad-blir-det-då?

Aronia Personnel

Aronia board

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Vice President, Novia

Vice Chairman
Kai Lindström
Professor, Åbo Akademi

Wilhelm Fortelius
Director of Aronia

Mikael Kilpi
Research Manager, Aronia

Barbro Schaumann
Academy Lecturer, Åbo Akademi

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Pieter Deleu
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2011-2012

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Project Leader
Baltic EcoMussel

Tiina Haaspuro
Project Leader
Växthusgaser i västra Nyland

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Mari Pihlajaniemi
Project Assistant
(information officer, webmaster)

Aatu Vattulainen
Head Observator
Halias (Hanko Bird Oservatory)

Lasse Kurvinen
Project Assistant (GIS)

Aronia Coastal Zone Research Team

Basic Funding

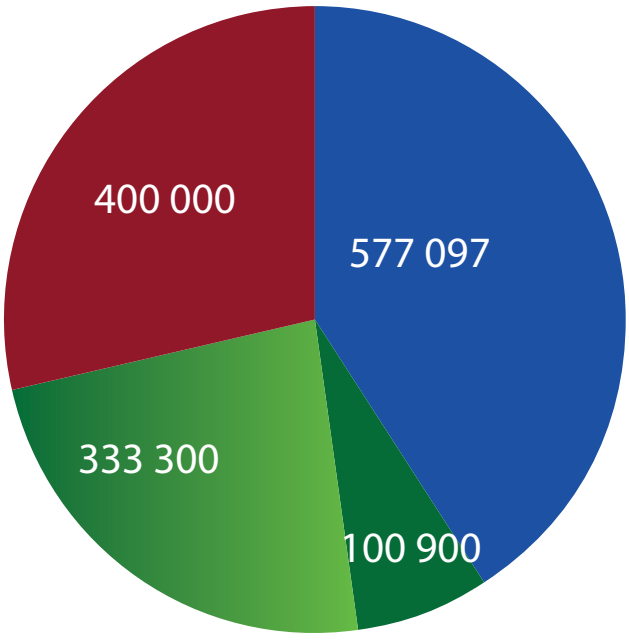
- Town of Raseborg
- Konstsamfundet
- Stiftelsen för Åbo Akademi

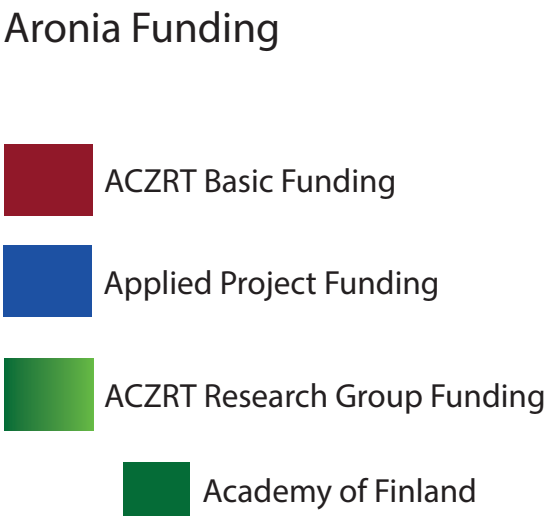
Research Groups Funding

- Academy of Finland
- Oskar Öflund Foundation
- Walter and Andrée de Nottbeck Foundation
- Victoria Foundation
- Intern NIVA -funding

Applied Projects Funding

- Centre for Economic Development, Transport and the Environment
- Central Baltic Interreg IV A Programme 2007-2013
- Finlandssvenska Jordfonden
- Kone foundation





Total 1 411 297 €

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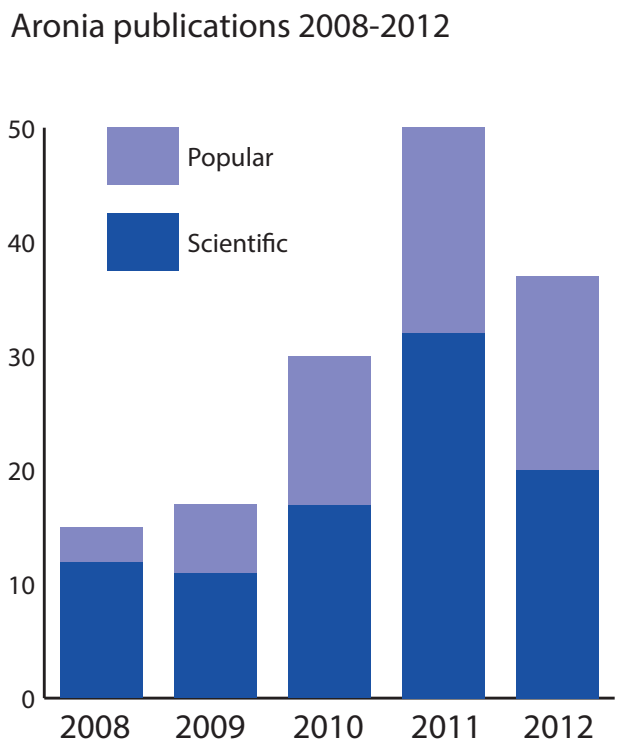

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