

Additional Material

Ecosystem services

In 2003 Denmark launched the NOVANA programme. This programme forms the basis for future nature and water quality assessments in Denmark, and as such also supports the administration of the Ramsar site networks. NOVANA is an acronym that could be translated to English as NMWANA (New Monitoring programme for WATER quality and NATURE), and aims at fulfilling the Danish obligations with regards to reporting conservation status of species and habitats covered by the EEC Birds and Habitats Directives annexes, as well as water quality and associated target species covered by the National 3rd Action Plan for the Aquatic Environment (Vandmiljøplan 3) as well as the EEC Water Framework Directive. The programme is described by Bijl et al. (2007). A first 'pre'-NOVANA assessment of the national conservation status of birds was published in 2003, and translated to English in 2006 (Pihl et al. 2006). National criteria for assessing favourable conservation status for the listed species and habitats were likewise published in 2003, and translated to English in 2007 (Søgaard et al. 2007), except for marine habitats, published solely in Danish (Dahl et al. 2005a). First assessments of reference conditions and development of Ecological Quality Objectives (EQOs) related to the Water Framework Directive were published in 2005-2006 (Dahl et al. 2005b, Petersen et al. 2006). Water bird monitoring programmes involves complete national mid-winter surveys every third year (e.g. Petersen et al. 2006b), and annual complete counts of selected species groups (e.g. swans, geese, dabbling ducks, rare breeding birds, e.g. Søgaard et al. 2006, 2007). The dabbling duck monitoring programme is built upon the much more comprehensive reserve monitoring programme from 1994-2001 (Clausen et al. 2004). Annual assessments of water quality are also available (latest summary report, Nordemann Jensen et al. 2010).

Monitoring of waterbirds is currently carried out from the Government owned field station on the Tipperne peninsula.

The Danish Nature Agency during 2009-2010 funded a research project aimed at describing the development in the water quality, salinity, vegetation, invertebrate fauna and staging waterbirds for the period 1929-2007. This was published in a monograph by Meltofte & Clausen (2011).

Bibliographical references

- Bijl, L. van der, Boutrup, S. & Nordemann Jensen, P. (ed.) (2007): NOVANA. Det nationale program for overvågning af vandmiljøet og naturen. Programbeskrivelse 2007-09 - del 2. Danmarks Miljøundersøgelser, Aarhus Universitet. - Faglig rapport fra DMU 615: 120 pp. <http://www2.dmu.dk/Pub/FR615.pdf>
- Clausen, P., Bøgebjerg, E., Hounisen, J.P., Jørgensen, H.E. & Petersen, I.K. (2004): Reservatnetværk for trækkende vandfugle. En gennemgang af udvalgte arters antal og fordeling i Danmark 1994-2001. Danmarks Miljøundersøgelser. - Faglig rapport fra DMU 490: 144 pp. http://www2.dmu.dk/1_viden/2_Publikationer/3_fagrappporter/rappporter/FR490.PDF
- Dahl, K., Petersen, J.K., Josefson, A.B., Dahllöf, I. & Søgaard, B. (2005a): Kriterier for gunstig bevaringsstatus for EFhabitatsdirektivets 8 marine naturtyper. Danmarks Miljøundersøgelser. - Faglig rapport fra DMU 549: 39 pp. http://www2.dmu.dk/1_viden/2_Publikationer/3_fagrappporter/rappporter/FR549.PDF
- Dahl, K.(ed.), Andersen, J.H.(ed.), Riemann, B.(ed.), Carstensen, J., Christiansen, T., Krause-Jensen,

- D., Josefson, A.B., Larsen, M.M., Petersen, J.K., Rasmussen, M.B. & Strand, J. (2005): Redskaber til vurdering af miljø- og naturkvalitet i de danske farvande. Typeinddeling, udvalgte indikatorer og eksempler på klassifikation. Danmarks Miljøundersøgelser. - Faglig rapport fra DMU 535: 158 pp.
- DMU (2007). Den danske rødliste / Fagdatacenter for Biodiversitet og Terrestrisk Natur (B-FDC). - Danmarks Miljøundersøgelser, [2004]. <http://redlist.dmu.dk>. Accessed 1 March 2008.
- Grell, M.B. (1998): Fuglenes Danmark. – Dansk Ornitologisk Forening, Gads Forlag, Copenhagen. 825 pp.
- IUCN (2007): 2007 IUCN Red List of Threatened Species. <http://www.iucnredlist.org/> Accessed 5 March 2008.
- Madsen, J., Pihl, S. & Clausen, P. (1998): Establishing a Reserve Network for Waterfowl in Denmark. A Biological Evaluation of Needs and Consequences. - Biological Conservation 85: 241-255. [http://dx.doi.org/10.1016/S0006-3207\(97\)00172-9](http://dx.doi.org/10.1016/S0006-3207(97)00172-9)
- Meltofte, H. & Clausen, P. (2011): Svømmefuglene på Tipperne 1929-2007. - Dansk Ornitologisk Forenings Tidsskrift 105: 1-120. http://www.dof.dk/sider/images/stories/publikationer/doft/dokumenter/svoemmefuglene_tipperne_1929_2007.pdf
- Miljø- og Energiministeriet, Skov- og Naturstyrelsen (1996): EF-fuglebeskyttelsesområder og Ramsarområder. Kort og områdebeskrivelser, status 1995. [With an English summary](national report on delineation of and species found within the Danish SPA and Ramsar site network). 273 pp.
- Miljø- og Energiministeriet, Skov- og Naturstyrelsen (1999): Birds of Danish SPAs – trends in occurrence. (national report on the status of species found within the Danish SPA and Ramsar site network). 119 pp. <http://www.sns.dk/natur/netpub/birds/helepubl.pdf>
- Naturstyrelsen 2011a: Natura 2000-plan 2010-2015. Ringkøbing Fjord og Nymindestrømmen Natura 2000-område nr. 69
- Habitatområde H62 Fuglebeskyttelsesområde F43 - Miljøministeriet, Naturstyrelsen. All Natura 2000 plans are available at: http://www.naturstyrelsen.dk/Naturbeskyttelse/Natura2000/Natura_2000_planer/Se_Planerne/
- Naturstyrelsen 2011b: Vandplan 2010-2015. Ringkøbing Fjord. Hovedvandopland 1.8. Vanddistrikt: Jylland og Fyn. - Miljøministeriet, Naturstyrelsen. All river basin management plans are available at: http://www.naturstyrelsen.dk/Vandet/Vandplaner/Se_vandplanerne/
- Nordemann Jensen, P., Boutrup, S., Bijl, L. van der, Svendsen, L.M., Grant, R., Wiberg-Larsen, P., Jørgensen, T.B., Ellermann, T., Hjorth, M., Josefson, A.B., Bruus, M., Søgaard, B., Thorling, L. & Dahlgren, K. 2010: Vandmiljø og Natur 2008. NOVANA. Tilstand og udvikling. Danmarks Miljøundersøgelser, Aarhus Universitet. 106 s. – Faglig rapport fra DMU nr. 767. <http://www2.dmu.dk/Pub/FR767.pdf>
- Petersen, J.K., Andersen, J.H., Dahl, K., Hansen, O.S., Josefson, A.B., Karlsson, J., Loo, L.-O., Magnusson, J., Moy, F. & Nilsson, P. (2006a): Reference conditions and EQOs for aquatic vegetation and macrozoobenthos. Copenhagen: Nordic Council of Ministers. - TemaNord 2006:510 : 138 pp.
- Petersen, I.K., Pihl, S., Hounisen, J.P., Holm, T.E., Clausen, P., Therkildsen, O.R. & Christensen, T.K. (2006b): Landsdækkende

optælling af vandfugle januar-februar 2004. Danmarks Miljøundersøgelser. - Faglig rapport fra DMU 606: 76 pp.

<http://www2.dmu.dk/Pub/FR606.pdf>

Petersen, J.K., Hansen, J.W., Laursen, M.B., Clausen, P., Carstensen, J. & Conley, D.J. (2008):

Regime shift in a coastal marine

ecosystem. - Ecological Applications 18(2): 497-510.

Pihl, S., Clausen, P., Laursen, K., Madsen, J. & Bregnballe, T. (2006): Conservation status of bird species in Denmark covered by

the EU Wild Birds Directive. National Environmental Research Institute. - NERI Technical Report 570: 128 pp.

<http://www2.dmu.dk/Pub/FR570.pdf>

Stoltze, M. & Pihl, S. (1998): RØDLISTE 1997 over planter og dyr i Danmark. - Miljø- og Energiministeriet 1998,

Danmarks Miljøundersøgelser og Skov- og Naturstyrelsen. <http://www.sns.dk/1pdf/rodliis.pdf>

Søgaard, B., Pihl, S. & Wind, P. (2006): NOVANA Arter 2004-2005. Danmarks Miljøundersøgelser. - Faglig rapport fra DMU

582: 148 pp. http://www2.dmu.dk/1_viden/2_Publikationer/3_fagrappporter/rapporter/FR582.pdf

Søgaard, B., Skov, F., Pihl, S., Nygaard, B., Laursen, K., Fredshavn, J.R., Ejrnæs, R., Clausen, P., Bregnballe, T., Madsen, J.,

Baatrup-Pedersen, A., Lauridsen, T.L., Søndergaard, M., Aude, E., Riis-Nielsen, T., Buttenschøn, R.M., Møller, P. & Nielsen,

K.E. (2007): Criteria for favourable conservation status in Denmark. - Natural habitat types and species covered by the EEC

Habitats Directive and birds covered by the EEC BirdS Directive. National Environmental Research Institute, University of

Aarhus. - NERI Technical Report 647: 92 pp. <http://www2.dmu.dk/Pub/FR647.pdf>

Søgaard, B., Pihl, S. & Wind, P. (2007): Arter 2006. NOVANA. Danmarks Miljøundersøgelser, Aarhus Universitet. - Faglig

rapport fra DMU 644: 88 pp. <http://www2.dmu.dk/Pub/FR644.pdf>

Thorup, O. & Laursen, K. (2011): Nyhedsbrev. Ynglefugle på Tipperne 2011.

http://www.dmu.dk/fileadmin/Resources/DMU/Om%20DMU/VIBI/Nyhedsbreve/Ynglefuglene_paa_Tipperne_2011.pdf

Vandmiljøplan 3. – see <http://www.vmp3.dk/>