Report

A5

Monitoring of invertebrates before concrete actions on Danish project sites

Monitoring conducted by: Wouter de Vries, Kåre Fog

Partner responsible: Amphi International ApS

Summary
This report presents the results of invertebrate monitoring conducted within the framework of Action A5 implemented as part of the SEMIAQUATICLIFE project – "Recreating habitat complexity for semi-aquatic fauna" (LIFE14 NAT/SE/000201). The first inventory was carried out in September 2017 within selected Danish sites. The data presented was collected by the experts from Amphi International ApS.

Objective
The objective of the investigations was the initial assessment of the abundance of the project invertebrate target species: *Leucorrhinia pectoralis* and *Graphoderus bilineatus.* The monitoring activities were performed at four Danish project sites, namely DK95, DK168, DK235 and DK163. The data gathered will serve as a reference base for the assessment of the foreseen impact of the conservation actions implemented throughout the project on the target invertebrate species.

Methods
Standard dip-netting method was used to record the invertebrate species. Dragonfly larvae of *L. pectoralis* and adult beetles of *G. bilineatus* were actively searched for during 45 min at each site by sweeping a hand dipnet (40* 40 cm frame) through vegetation and surface sediment. Also, the riparian vegetation was searched for exuvia of the target dragonflies. In total, 34 ponds and their surroundings were investigated.

Moreover, habitat conditions for the dragonfly and water beetle species were assessed for each pond monitored. The habitat status was considered "suitable", if the pond surveyed was characterised by clear water and well-developed aquatic vegetation, constituting good living conditions for the invertebrate target species. In the case where adequate living conditions for the target species would be created after improvement of current habitat conditions through e.g. introduction of restoration measures such as outlet blocking and raising of water level, the status of the habitat was considered to be "potentially suitable".

Results

None of the target invertebrate species was recorded at the investigated project sites. The results of the assessment of habitat conditions for both invertebrate species for each pond surveyed are summarized in Table 1.

Table 1. Summary of results per pond for each of the investigated sites.

Project site number	Project site name	Target invertebrate species	Pond number	Habitat status	
				L. pectoralis	*G. bilineatus*
DK95	Hostrup Sø, Assenholm Mose og Felsted Vestermark	*Leucorrhinia pectoralis*	DK95-001	suitable	suitable
			DK95-002	unsuitable	unsuitable
			DK95-003	unsuitable	unsuitable
			DK95-004	unsuitable	unsuitable
			DK95-005	suitable	potentially suitable
			DK95-006	suitable	unsuitable
			DK95-007	suitable	potentially suitable
			DK95-008	suitable	suitable
			DK95-009	suitable	unsuitable
			DK95-010	unsuitable	unsuitable
			DK95-011	unsuitable	unsuitable
DK163	Suså, Tystrup-Bavelse Sø, Slagmosen	*Leucorrhinia pectoralis; Graphoderus bilineatus*	DK163-01	unsuitable	unsuitable
DK168	Havet og kysten mellem Præstø Fjord og Grønsund	*Leucorrhinia pectoralis*	DK168-001	potentially suitable	unsuitable
			DK168-002	unsuitable	unsuitable
			DK168-003	unsuitable	unsuitable
			DK168-004	unsuitable	unsuitable
			DK168-005	unsuitable	unsuitable
			DK168-006	potentially suitable	unsuitable
			DK168-007	potentially suitable	unsuitable
			DK168-008	unsuitable	unsuitable
			DK168-009	unsuitable	unsuitable
			DK168-010	suitable	suitable
			DK168-011	potentially suitable	unsuitable
DK235	Jægerspris Skydeterræn	*Leucorrhinia pectoralis*	DK235-001	unsuitable	unsuitable
			DK235-002	unsuitable	unsuitable

			DK235-003	unsuitable	unsuitable
			DK235-004	unsuitable	unsuitable
			DK235-005	suitable	unsuitable
			DK235-006	unsuitable	unsuitable
			DK235-007	suitable	unsuitable
			DK235-008	unsuitable	unsuitable
			DK235-009	unsuitable	unsuitable
			DK235-010	unsuitable	unsuitable
			DK235-011	unsuitable	unsuitable

DK95 Hostrup Sø, Assenholm Mose og Felsted Vestermark

11 sites were investigated within the area „Søgårdlejren". It has been assessed that several sites in the northern part of the project area provide suitable habitat conditions for *L. pectoralis*, namely: 001, 005, 006, 007, 008, 009. Additionally, sites 001 and 008 constitute a suitable habitat for *G. bilineatus* while sites 005 and 007 - a potentially suitable habitat for the species. Pond characteristics are described in Table 2.

Sites 010 and 011 located in the southwestern part of this project area are characterised by low water level, unsuitable for the target species.

Finally, ponds at sites 002, 003 and 004 are too small and shallow or of temporary character to constitute living habitat for the target invertebrate species.

Picture 1. Pond number DK95-001 – suitable conditions for *L. pectoralis* and *G. bilineatus*.

Picture 2. Pond number DK95-009 – suitable conditions for *L. pectoralis*.

Figure 1. DK95 - habitat conditions for *L. pectoralis*.

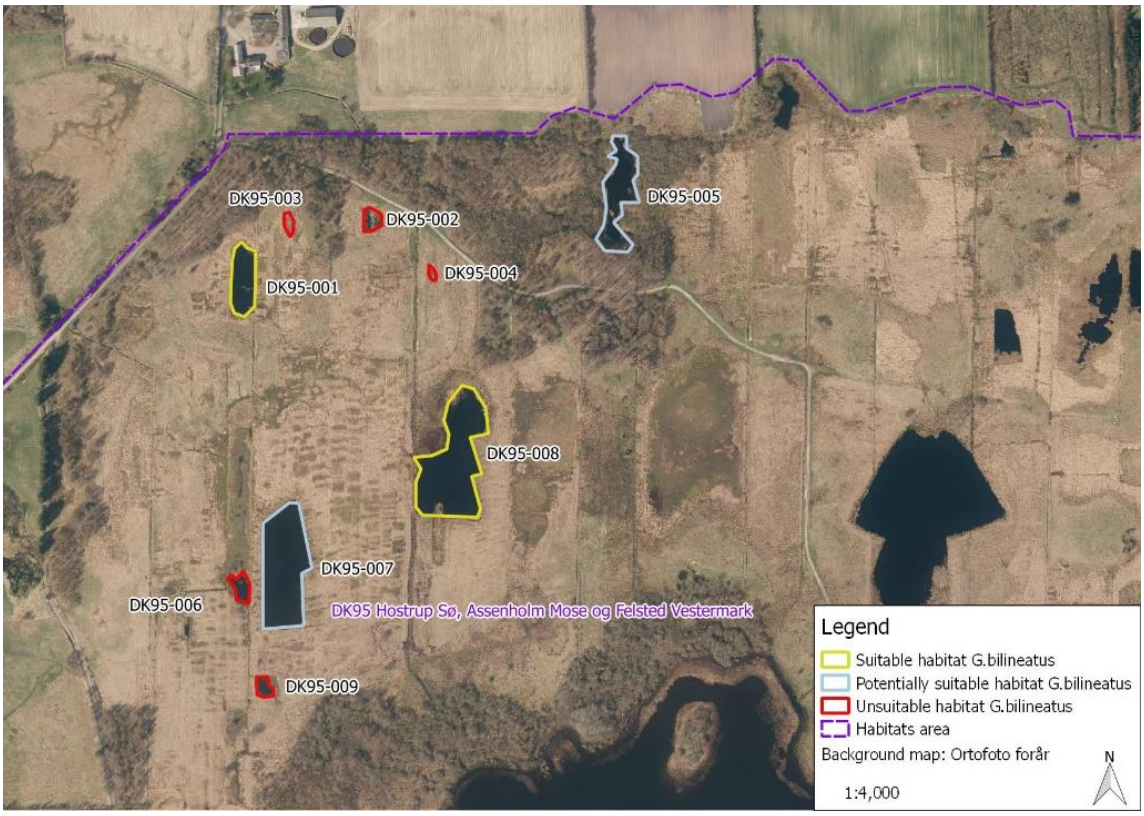

Figure 2. DK95 - habitat conditions for *G. bilineatus.*

Figure 3. DK95 - monitored ponds unsuitable for the target invertebrate species.

DK163 Suså, Tystrup-Bavelse Sø, Slagmosen

Monitoring activities were conducted at one site within this project area. Site 001 does not provide proper habitat conditions for the target invertebrate species, as it is characterised by the presence of a stickleback population and duck feeding activities as well as scarce aquatic vegetation.

Figure 4. DK163 - monitored pond unsuitable for the target invertebrate species.

Picture 3. DK163 - unsuitable habitat conditions for the target invertebrate species.

DK168 Havet og kysten mellem Præstø Fjord og Grønsund

Within DK168, the monitoring activities were carried out at 11 sites. The clear-water lake, abundant in submerged mosses, located at site 010 provide suitable habitat conditions for both *L. pectoralis* and *G. bilineatus.* A proper habitat for *L. pectoralis* could develop around the newly established and developing lake of site 006 as well as after improvement of habitat conditions at site 001, currently characterised by the presence of dense reed. Moreover, sites 007 and 011, vegetated by *Potamogeton natans*, could potentially provide good conditions for the dragonfly species, therefore are assessed as "potentially suitable".

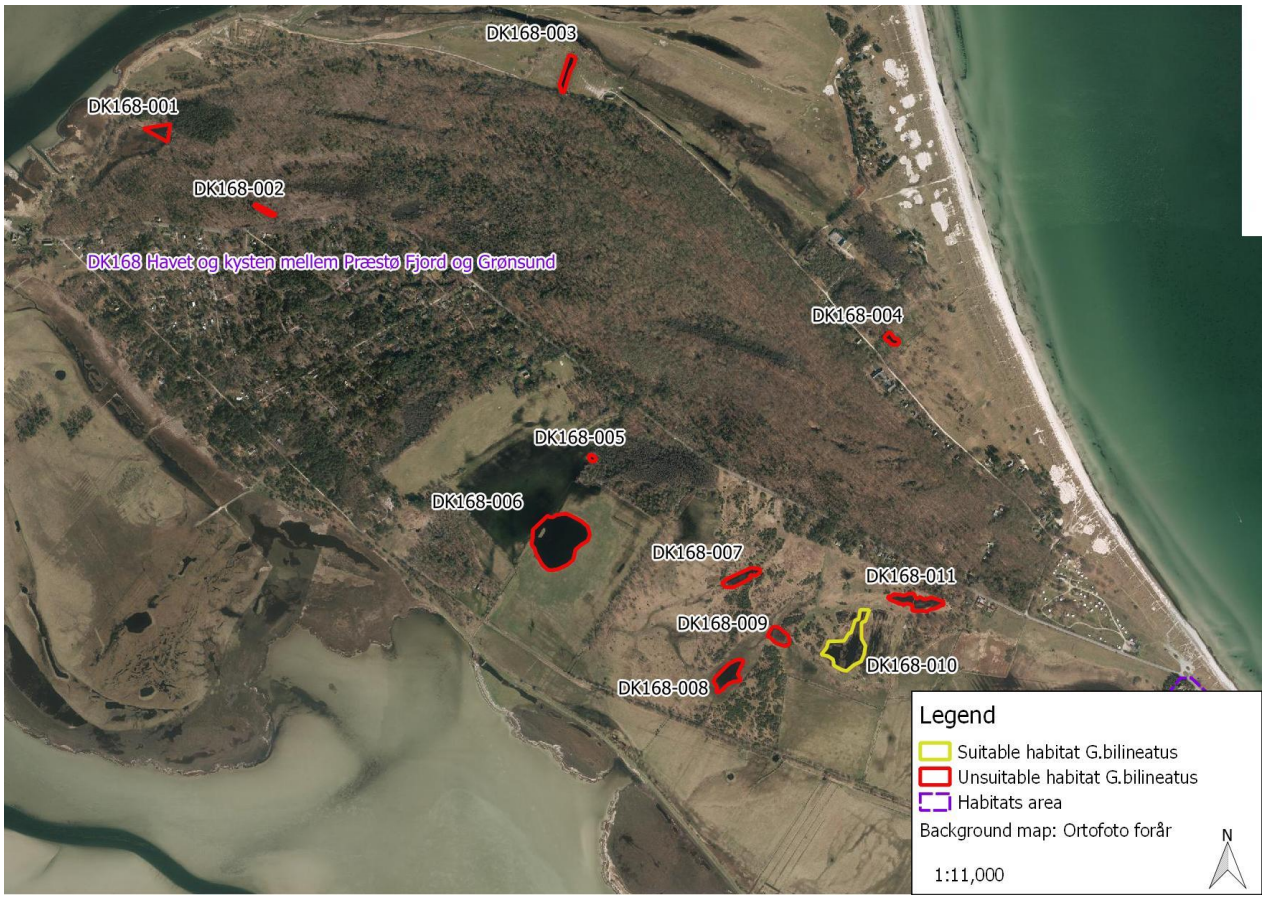

Figure 5. DK168 - habitat conditions for G. bilineatus.

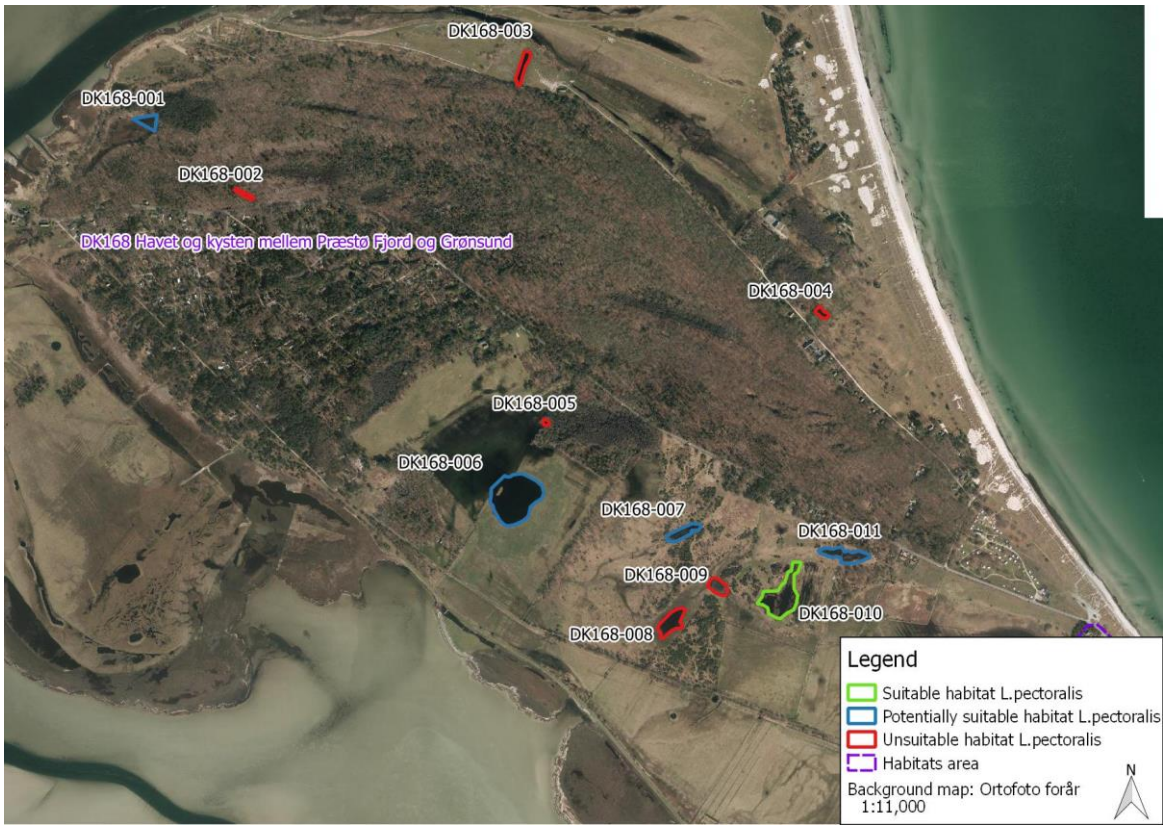

Figure 6. DK168 - habitat conditions for L. pectoralis.

DK235 Jægerspris Skydeterræn

11 sites were surveyed within the DK235 project area. Two of the investigated sites are considered to constitute a suitable habitat for the dragonfly species: site 005 (large pond in the northern part, abundant in submerged moss) and site 007 (coastal pond with clear water, vegetated by *Potamogeton sp*.).

Picture 4. Pond number DK235-005 – suitable conditions for L. pectoralis.

Picture 5. Pond number DK235-006 - unsuitable conditions for the target species.

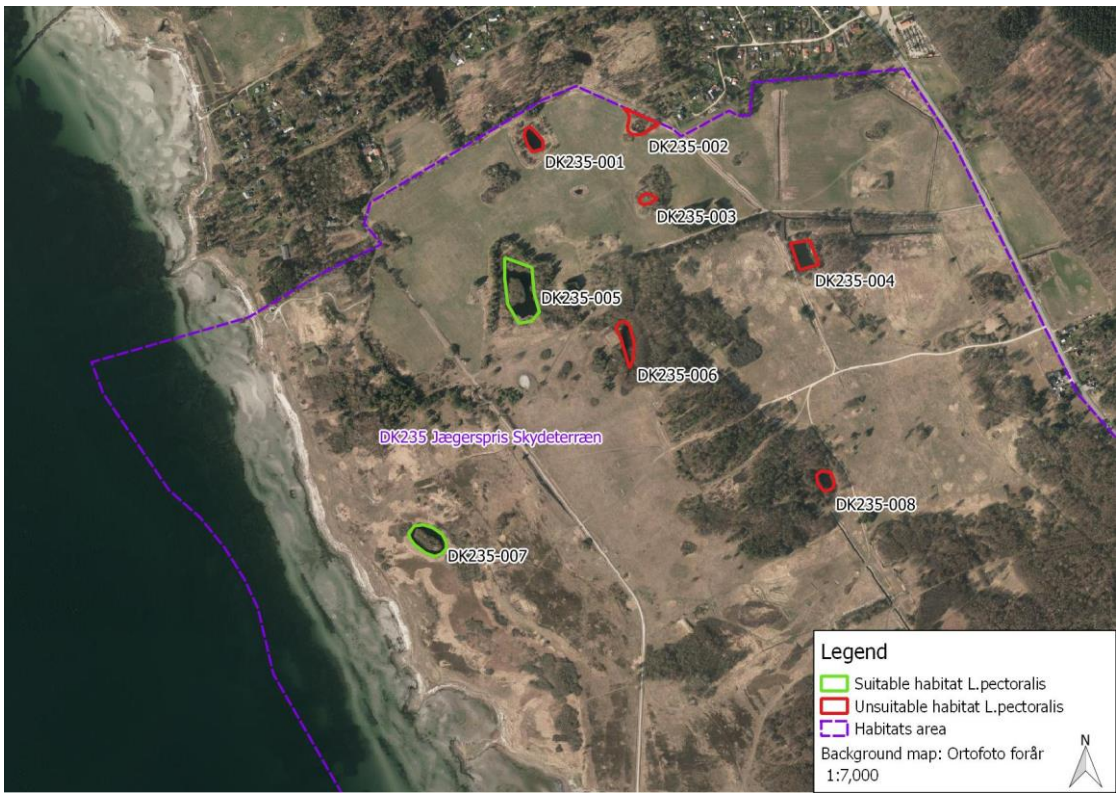

Figure 7. DK235 - habitat status for *L. pectoralis*.

Figure 8. DK235 - monitored ponds unsuitable for the species.

Table 2. Characteristics of the investigated ponds per project site.

Site number	Area [m^2]	Date of visit	Description
DK95-001	2936	11-Sep-17	Clear brown water, sun exposed site, flood zone vegetated by *Carex* and *Eriophorum*; previous peat excavation site; observed many individuals of genus *Leucorrhinia** and *Graphoderus sp*.**;
DK95-002	646	11-Sep-17	*Sphagnum* present; observed larvae of genus *Leucorrhinia**;
DK95-003	308	11-Sep-17	*Sphagnum* abundant;
DK95-004	146	11-Sep-17	*Sphagnum* abundant;
DK95-005	5029	11-Sep-17	Large, sun exposed, brown water pond; flood zone with *Potentilla palustris, Carex* and *Typha*;
DK95-006	767	11-Sep-17	Small, *Sphagnum* abundant site; observed many larvae of *Leucorrhinia* genus*;
DK95-007	9280	11-Sep-17	Large, open, clear brown water site, steep pond edges, scarce flooded vegetation; previous peat excavation;
DK95-008	11157	11-Sep-17	Small lake, with flooded edge *Carex* and *Typha*;
DK95-009	513	11-Sep-17	Small site; abundant in *Leucorrhinia* genus larvae*;
DK95-010	532	11-Sep-17	Small *Glyceria* pond, flood zone with *Potentilla palustris*; the site needs urgent dredging;
DK95-011	918	11-Sep-17	Sun exposed, with steep slopes and low water level; site located at the edge of a forest;
DK163-01	2634	7-Sep-17	Large shallow pond, with large temporary flood zone; vegetated by *Typha latifolium, Scirpus, Schoenoplectus, Sparganium, Alisma, Juncus, Polygonum amphibium*; muddy bottom, predominantly greyish, but pretty clear; duck feeding and stickleback population present;
DK168-001	2773	10-Sep-17	Large, shallow lake with dense reed; open in grazed area; diverse vegetation;
DK168-002	874	10-Sep-17	Elongated pond located in a forested area, shaded; 30% *Lemna minor* and very thick leave layer;
DK168-003	2788	10-Sep-17	Elongated, sun exposed pond; recently cleared; fish population present;
DK168-004	1186	10-Sep-17	Elongated, sun exposed pond of clear water; vegetated with *Typha*; stickleback population present;
DK168-005	430	10-Sep-17	Small, partly shaded pond with steep banks; observed 3 stickleback individuals;
DK168-006	26583	10-Sep-17	Large lake, flood zone vegetated with *Juncus*; developing; abundance of dragonfly species;
DK168-007	3963	10-Sep-17	Cattle pond with large, shallow flood zone vegetated with *Eleocharis* and *Potamogeton natans*; clear, brown water; 50% submerged vegetation;
DK168-008	5775	10-Sep-17	Natural depression, flood zone densely vegetated by *Eleocharis*; 10-15 cm water level;
DK168-009	3152	10-Sep-17	Large flood zone vegetated *Typha angustifolia*; less than 1 m deep, few m2 open water;

DK168-010	14417	10-Sep-17	Small, clear brown water lake, with submerged mosses, *Nuphar luteum, Typha, Phragmites*; grazed flood zone; Sticklebacks with flat-worm like parasites;
DK168-011	6333	10-Sep-17	Elongated pond with >50% flood zone vegetated by *Glyceria*, open water, vegetation include moss and *Potamogeton natans*;
DK235-001	1845	9-Sep-17	Large, open, shallow pond with clear water, *Chara* abundant;
DK235-002	2812	9-Sep-17	Temporary depression;
DK235-003	771	9-Sep-17	Depression overgrown with *Salix*; located at the edge of a grassland, dry;
DK235-004	3266	9-Sep-17	Large, permanently open water site with scarce aquatic vegetation;
DK235-005	9873	9-Sep-17	Large, shallow pond rich in submerged moss; thick mud layer with 0,5 m of water;
DK235-006	2700	9-Sep-17	Shallow pond with extensive flood zone; very thick organic mud layer;
DK235-007	5003	9-Sep-17	Large, clear-water pond abundant in *Potamogeton*;
DK235-008	1628	9-Sep-17	Large, deep pond; present *Salix* and *Typha*;
DK235-009	2852	9-Sep-17	Large, open water pond; *Salix* present, no aquatic vegetation;
DK235-010	804	9-Sep-17	Shallow pond with large flood zone; water level 0,5 m; muddy bottom; *Salix* and *Alnus* present;
DK235-011	1091	9-Sep-17	Shallow, dried out pond with dense muddy bottom; *Typha, Potamogeton natans*.

* other than *Leucorrhinia pectoralis*
** other than *Graphoderus bilineatus*

Discussion

Neither *L. pectoralis* nor *G. bilineatus* were registered at the investigated project sites during the monitoring activities conducted within the framework of the SemiaquaticLife project. Nevertheless, as noted in this report, several sites within the selected project areas are characterised by habitat conditions that are suitable for the invertebrate target species. Consequently, presence of the dragonfly and water beetle species is expected at these sites, and the reason for no recordings is believed to be small size of the species populations.

Moreover, several ponds were assessed to create “potentially suitable” habitat conditions for *L. pectoralis* and *G. bilineatus.* Introduction of restoration measures, including blocking of outlets and raising the water level could improve the habitat status of such sites, creating good living conditions for the target invertebrate species.

Annex I Location of sites monitored within the project areas

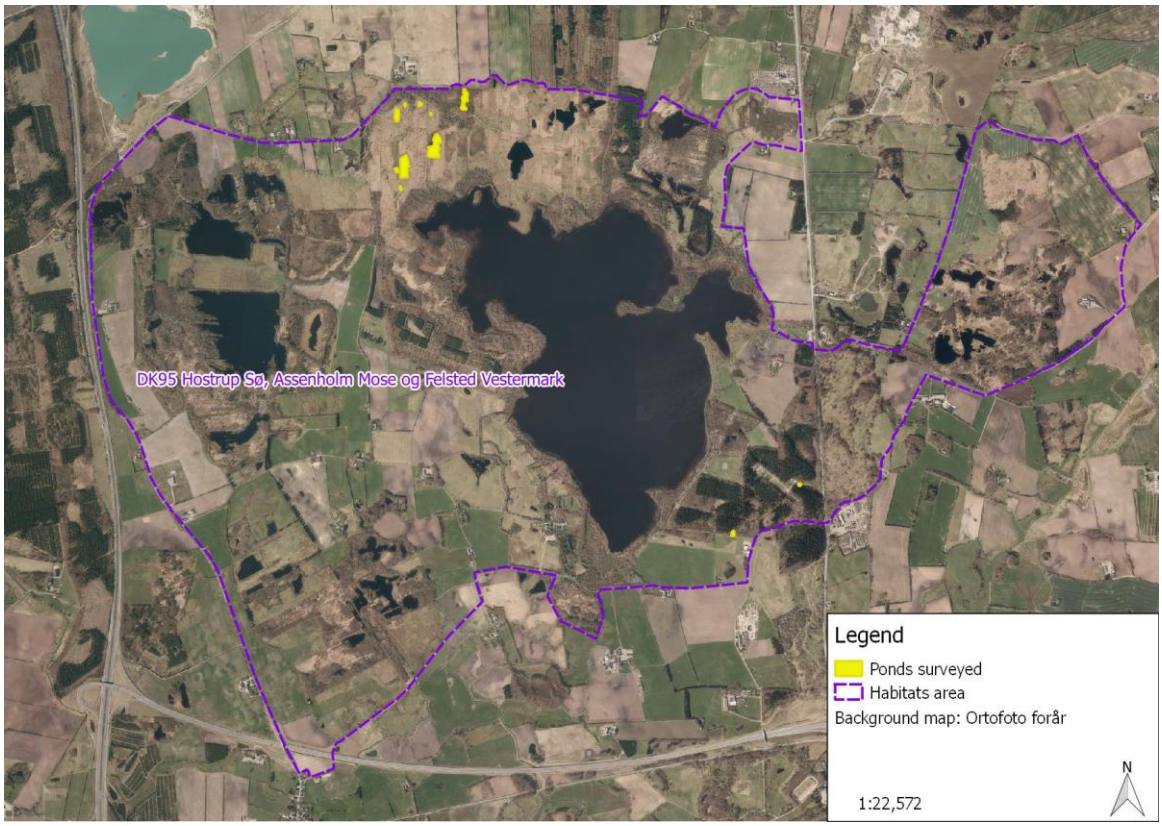

Figure 9. DK95 Hostrup Sø, Assenholm Mose og Felsted Vestermark

Figure 10. DK168 Havet og kysten mellem Præstø Fjord og Grønsund

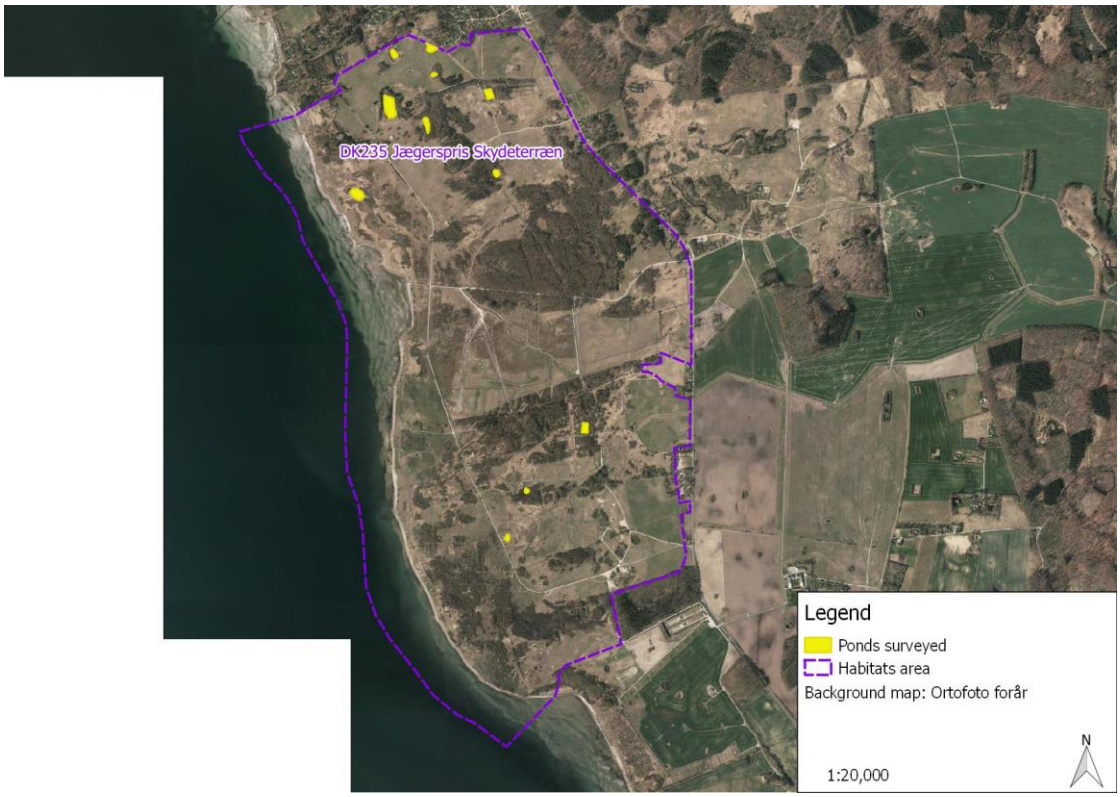

Figure 11. DK235 Jægerspris Skydeterræn

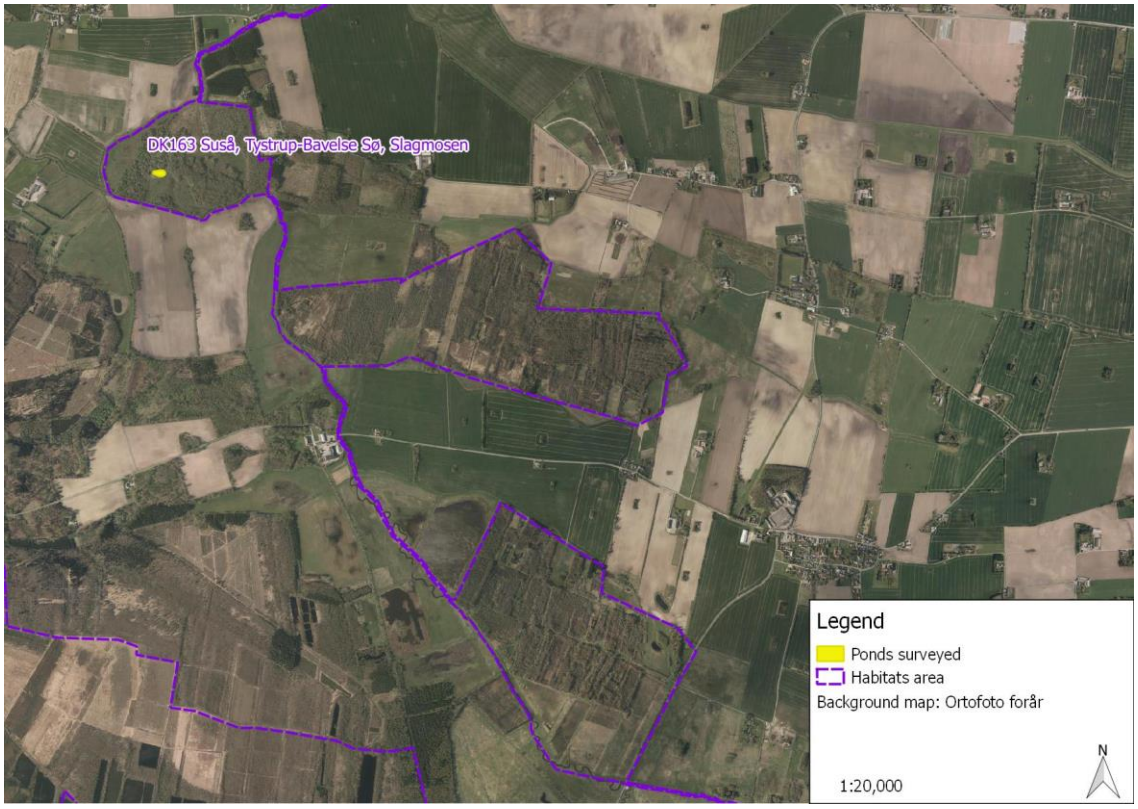

Figure 12. DK163 Suså, Tystrup-Bavelse Sø, Slagmosen.

Rapport

A5

Basisregistrering af vandinsekter på udvalgte danske projektområder

Version nr. 1, 14. juni 2017

Udarbejdet af: **Niels Damm, Lars Lønsmann Iversen**

Ansvarlig partner: **Amphi International ApS**

Baggrund

Denne rapport sammenfatter resultater fra registrering af vandinsekterne lys skivevandkalv, bred vandkalv, stor kær guldsmed og grøn mosaikguldsmed på relevante danske projektområder under Life projektet SemiAquaticLife – "Recreating habitat complexity for semi-aquatic fauna" (LIFE14 NAT/SE/000201). Projektet har som mål at genskabe og forbedre bevaringsstatus for krybdyr, padder og vandinsekter i Natura-2000-områder i det sydlige Sverige (11), Danmark (18), og Slesvig-Holsten (9). Målet er at sikre livskraftige metapopulationer af arter optaget på bilag II og IV i EU´s Habitatdirektiv.

DK 97 Frøslev Mose

Projektområdet har stor kærguldsmed som målart. Flyvende adulte individer af stor kærguldsmed er eftersøgt af Niels Damm i varmt, solrigt og stille vejr i slutningen af maj og starten af juni. Arten blev ikke observeret. Stor kærguldsmed registreres lejlighedsvis i den tyske side af mosen, men blev ikke set i 2017.

DK 186 Almindingen

Projektområdet har vandinsekterne lys skivevandkalv, bred vandkalv, stor kærguldsmed og grøn mosaikguldsmed som målarter. Vandkalvene, larver af guldsmedene, samt flyvende adulte stor kærguldsmed er eftersøgt af Lars Iversen og Niels Damm i varmt, solrigt og stille vejr d. 26. – 27. maj.

Målarterne er eftersøgt i 15 søer. 4 søer med eksisterende forekomster blev ikke besøgt fordi ingen eller kun mindre forbedringer er planlagt i de pågældende søer. Lys skivevandkalv og bred vandkalv er fundet i henholdsvis 6 og 4 af skovens søer. Begge arter er fundet på tre nye lokaliteter i forhold til den eksisterende viden. Grøn mosaikguldsmed er fundet i to søer med bestande af krebseklo, men er kendt fra yderligere to søer i Almindingen. Stor kærguldsmed er í 2016 registreret ved Krystalsøen og Sortemyr på det nordlige Bornholm, men er ikke observeret ved søer i Almindingen. Arten forventes at kolonisere Almindingen med tiden.

Tabel 1: Forekomst af målarter i Almindingen. Grå celler markerer undersøgte lokaliteter, "x" angiver eksisterende viden om forekomst, lys grøn farve markerer genfund af art på kendt lokalitet, mørk grøn farve markerer fund af art på ny lokalitet.

Lokalitet	Bred vandkalv	Lys skivevandkalv	Grøn mosaikguldsmed	Stor kærguldsmed
Stakkelemose		x		
Gammelmose		x		
Græssøen	x		x	
Borgesø			x	
Bastemose	1 larve	3 ad	larver	
Iglemose	2 larver		larver	
Baremose	1 larve			
Tvillingehullerne				
Tvillingmyr				
Svinemosen	2 larver + 1 ad (hun)			
Åremyr	x	2 ad		
Hagemyr				
Røverkær				
Store grankule				
Svovlmyrene				
Suppegryden				
Puggekullekær	1 ad (han)	2 ad		
Rappekær	25 larver			
Ravnekær		4 ad		
Sum, antal lokaliteter	**8**	**6**	**4**	**-**

Tilgroning af Bastemosen med krebseklo er en trussel mod begge arter af vandkalve. I Iglemosen er tilgroningen med krebseklo og bredbladet dunhammer så fremskreden at en indsats i forhold til at genskabe et varmt levested for bred vandkalv haster. I en række af de andre søer er vandstanden sænket ved grøftning og etablering af overløb hvilket fremmer tilgroning med bl.a. bredbladet dunhammer og pilebuske. Hævning af vandstand og fjernelse af tilgroning er påkrævet. Forslag til indsats under aktion A3 blev justeret efter at have genbesøgt søerne efter løvspring.

Puggekullekær med bestand af både lys skivevandkalv og bred vandkalv.

Bred vandkalv, han.