# The Pied Avocet in Vellinge – an example of successful conservation measures

DE: Säbelschnäbler DK: Klyde SE: Skärfläcka

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**The Pied Avocet *Recurvirostra avosetta* served as an indicator species in one of the reference sites (Vellinge, SW Sweden) within EU´s LIFE-project BaltCoast in 2007–2011. This reference population, the largest breeding colony in Sweden, was chosen as it had been censused since 1988 and its fluctuations have been registered. During the last decade heavy predation and floods have necessitated measures in order to support the population and enhance reproduction success. Different measures were taken and gradually improved within the project leading to the final success in 2011.**

The Pied Avocet *Recurvirostra avosetta* is a well-known breeding bird in Vellinge. This slender, black-and-white wader, with its thin, upcurved bill, is an easy species to identify (Figure 1). You often see it in sandy and marshy areas along parts of the Vellinge coastline. From the Harbour Road and the former embankment in Skanör, you can watch the Avocet´s family life on a small islet called Landgrens holme, today the species´ main breeding site (Bentz et al. 2007).

The Avocet returns from its wintering areas in southwestern Europe and northern Africa in late March and early April. It often breeds in colonies with up to hundreds of pairs on grazed coastal meadows and sandy reefs, but can also breed solitary. Mating starts immediately after arrival and the first eggs are laid in the end of April. The clutch usually consists of 3 to 4 eggs in a depression in the grass or sand (Figure 2). Both sexes incubate for 23–27 days.

Floods sometimes destroy the clutches, but the Avocet then lays another clutch, though with fewer eggs, in another place. Egg predation is very common, in spite of the fact that the parents defend their clutch by attacking and chasing the predator. Red Foxes *Vulpes vulpes*, Badgers *Meles meles* and even free running dogs can ruin even big breeding colonies. Grazing cattle and sheep sometimes cause damage to eggs and chicks by tramping or laying down on them.

Figure 1. The Pied Avocet. *Photo: P-G Bentz/Sturnus.*

Figure 2. The Avocet´s nest. *Photo: P-G Bentz/Sturnus.*

The chicks hatch in late May and a hectic period follows in the Avocet colony. The chicks immediately find their own food in shallow water, guided by their parents. When foraging they move their heads sideways, sweeping the bill through the water in order to catch food items like sandworms, insects and small crustaceans. Snails, shells and even small fish are also found on the menu. The parents are busy protecting their chicks (Figure 3) but still many are taken by Corvids and gulls.

Competition for food and space force the breeding pairs with chicks to spread over vast areas just a few days after hatching. Chicks not yet fledged have been found up to 1.5 km away from the hatching site.

After 35–43 days, depending on food resources, the chicks are fledged. They look very much like the adult birds, but the black parts of the plumage tend to be brownish-black. By now the chicks are independent and the adult birds gather in big flocks before taking off for the moulting areas in Vadehavet along the western coast of Jutland, south westernmost Denmark. After finishing the moult, the birds continue to their wintering areas. The yearlings leave somewhat later and single birds can be observed as late as October.

According to estimates, one third of the Swedish Avocet population, lately estimated to 1 200 pairs, breed in Vellinge. The County Administrative Board has given Falsterbo Bird Observatory the task of conducting annual census of the breeding population on the Falsterbo peninsula since 1988 (Walinder & Karlsson

Figure 3. Female Pied Avocet with chicks. *Photo: P-G Bentz/Sturnus.*

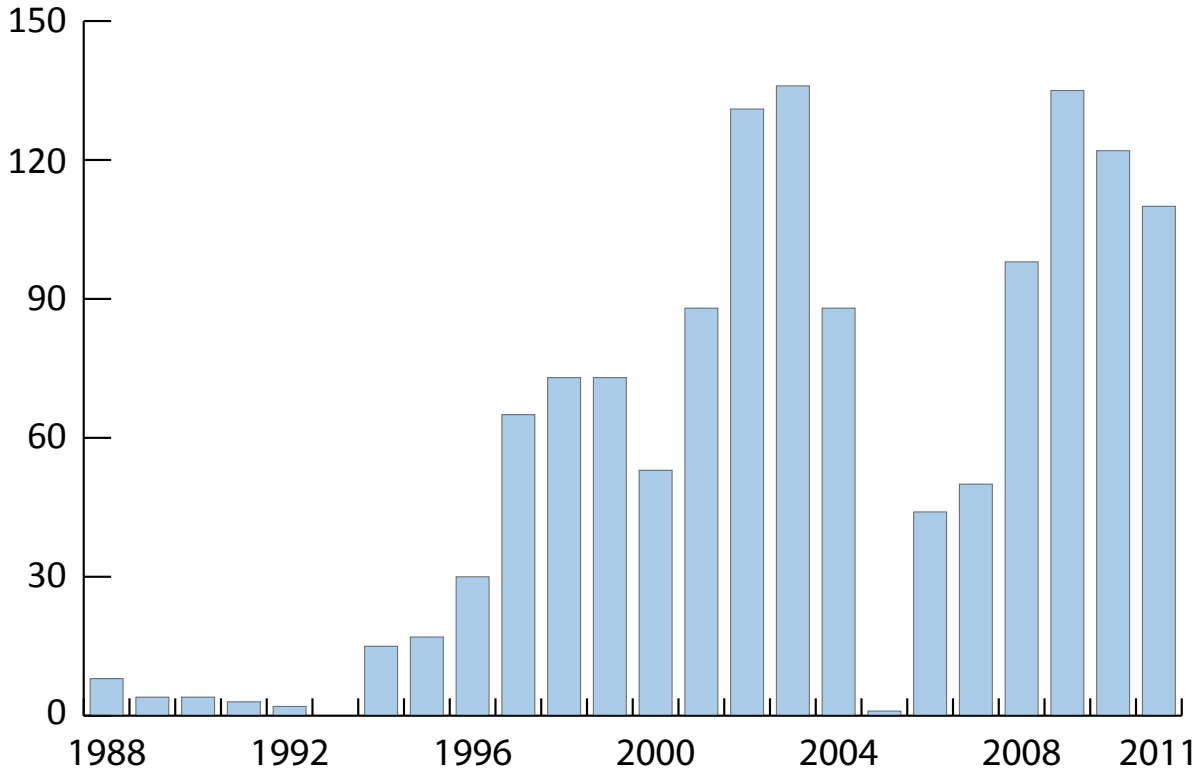


Figure 4. Number of Pied Avocet pairs attempting to breed in the Flommen nature reserve in the period 1988–2011.

2003, 2004). The population has varied from some ten to 140 pairs. The diagram (Figure 4) shows the number of pairs starting to breed in the nature reserve of Northern Flommen, a wetland area which includes Landgrens holme.

Landgrens holme was partly covered by birch trees and bushes until 1994. After all ligneous vegetation was removed in 1994 and grazing was re-established the Avocets found Landgrens holme an attractive breeding area (Figure 5). The islet is 5000 $m^2$ and the shallow water surrounding it is connected to the sea by channels.

Figure 5. Landgrens holme. *Photo: P-G Bentz/Sturnus.*

## The LIFE-project

When the EU-project LIFE-BaltCoast started in 2007 the Pied Avocet was appointed target species (Bentz & Forslund 2007). The aim of the project was to preserve the character of the low-lying coastal landscape around the Baltic and the biodiversity in these habitats, especially grazed meadows, coastal lagoons and sand dunes. Furthermore, coastal habitats that were on the decrease should be recreated. Participating countries were Denmark, Estonia, Lithuania, Germany and Sweden.

## Landgrens holme and the Pied Avocet

The total area which today is fenced off for grazing covers 47 hectares (Figure 6). From the old embankment in the northeast the public has an excellent view over the area and the Pied Avocet´s family life can easily be followed. To get a better over-all-view, more correct figures of the number of incubating birds and to follow the progress of breeding a lift, 18 meter high, have been used in periods For close up studies a hide was lowered into the ground (Figure 7).


Figure 6. Fenced area in the Flommen Nature Reserve. Landgrens holme is marked with X.


Figure 7. The hide for ”low level studies” of the Pied Avocet on Landgrens holme. *Photo: P-G Bentz/Sturnus.*

## The breeding seasons 2002 – 2006

The number of breeding Pied Avocet has varied from year to year as mentioned above. The breeding success has been difficult to estimate and is consequently only presented as brief indications. There is no correlation between the number of breeding pairs and the outcome of the their efforts. Due to heavy predation and floods some years no fledged juveniles were registered.

In 2002 no less than 100 clutches hatched and close to 350 newly hatched chicks were seen on and around Landgrens holme. Normally within 5 to 15 hours the whole clutch is hatched and the chicks immediately start to look for food items. Due to food competition and lack of space, as mentioned above, many of the adult birds lead their chicks away from the breeding site. This happens just one or two days after hatching. Many chicks then have to cross the road leading to Skanörs harbour (Figure 8). In previous years many chicks were killed by cars (up to 40 on one occasion – Figure 9). In 2002 a crossing for Avocet chicks were set up and speed bumps were installed temporarily. These actions are still ongoing and seem to have reduced the number of road killed Avocet chicks significantly. Still only one third of the chicks were thought to have reached fledged stage.

Figure 8. Avocet crossing. *Photo: P-G Bentz/Sturnus.*

Figure 9. Road-killed Avocet chicks. *Photo: Mikael Kristersson.*

In 2003 only twelve clutches out of 136 hatched due to heavy predation, mainly from Red Foxes and Badgers but footprints of Mink/European Polecat *Mustela vison*/*M. putorius* as well as dogs, were found in the mud around the islet.

Badgers wiped out the colony in 2004. Just a few days before estimated time of hatching Badgers plundered the colony during one night, and apparently attracted by the chicks´ calls from inside the eggs. None out of 88 clutches hatched.

In 2005 just a few Pied Avocet pairs initiated breeding and the outcome is uncertain. No fledged chicks were seen.

More than 40 Avocet pairs started to breed in 2006. However, recurrent floods and extensive nest predation led to the inevitable result that no chicks hatched.

## The breeding season in 2007 – Western Jackdaws on the stage

Before the breeding season in 2007, the first project year of LIFE-BaltCoast, measures were taken in order to support the local population of Pied Avocets and increase reproduction rate. The water surrounding Landgrens holme is connected to the sea through a system of lagoons and narrow channels and thus fluctuates according to changes in the sea level. To avoid these fluctuations a provisional dam was constructed. This measure was taken in order to get a stable water level around the breeding islet and thus avoid floods to destroy the nests. Another expectation was to prevent four-legged mammals to reach the islet at low water levels.

Furthermore, to prevent predation from mainly Red Foxes and Badgers, an electric fence measuring 2 x 4 kms was erected around the pasture surrounding Landgrens holme (Bentz et al. 2008).

In 2007, when 50 pairs of Pied Avocets had started to incubate, a new predator appeared on the stage. During occasional power cuts in the electric fence four-legged predators took the advantage and enjoyed the free buffet on the islet. After such raids the Pied Avocet colony suffered further losses from the new predator Western Jackdaws Corvus monedula, which frequently visited the islet making use of the disorder and lack of collective defence following predation by mammals. In compact flocks of 15–20 the Jackdaws minutely searched the area for eggs. The breeding colony suffered heavy losses and no clutches hatched. Some Avocet pairs moved to another area within the nature reserve and 3–4 clutches hatched. It is unknown if any chicks grew up to a fully-fledged stage.

## Crucial measures taken in 2008

In early 2008, well before the start of the Pied Avocet´s breeding season, the electric fence was improved and the maintenance routines were changed. On stretches where the fence crossed water the lower wire was elevated to run well above the water surface in order to avoid short-circuits. The grass below the lower wire was regularly cut very short for the same reason and the voltage was checked every day (Figure 10).

Floods have occasionally caused damage to

Figure 10. The electric fence voltage (6000 V) was checked every day. *Photo: P-G Bentz/Sturnus.*

Figure 11. The permanent dam is adjustable. *Photo: P-G Bentz/Sturnus.*

the breeding colony as eggs have been washed away. But the most important negative influence on the breeding success have has been low water levels which make the islet accessible to four-legged predators as mentioned above. Low water levels occur quite often in April when the Pied Avocets arrive at the site and start breeding. On such occasions the birds simply leave the area. Sometimes they come back later and take up egg-laying when the water level rises. Apparently this behaviour is an adaption to or at least a consequence of the threat from mammal predators. The provisional dam construction from 2007 proved to be insufficient. Unfortunately the water broke through and the undesired fluctuations in water level continued, opening up the breeding colony to four-legged predators. Apparently the electric fence alone was not efficient to prevent nest predation on the islet.

In order to try to stabilize the water level around the islet in 2008, a permanent dam was constructed at one of the two connecting channels (Figure 11) while the other was filled up and closed with sand. The permanent dam construction is adjustable so that the water level can be controlled in a way which is advantageous to the breeding colony. The dam was built of high quality oak board and will last for many years.

For many years disturbances were also caused by free running dogs and senseless humans beside the expected predators looking for eggs and chicks. Dogs have been observed running across the islet on some occasions and footprints in the mud have been registered from time to time. Curious people have approached the islet in order to get a closer look at the birds and families looking for a picnic site have been seen on the islet in the breeding season. Signs have been erected to inform the public about the Pied Avocet colony and how vulnerable it is to disturbance (Bentz et al. 2011). The public has also been informed through mass media that the Pied Avocet´s family life can easily be observed from the former railway embankment just outside the nature reserve without disturbing the birds.

Free running dogs seem to be a minor problem today, probably as a consequence of the intense information campaign that has been launched in the local communities.

Figure 12. Cattle and Pied Avocets go on very well together. *Photo: P-G Bentz/Sturnus.*

The presence of cattle is most important to avoid disturbance to the breeding colony. In 2008 young heifers and bulls (27 individuals altogether) were grazing within the fenced area. Apparently the cattle prevented people from approaching the breeding colony on the islet. Thus the role of the cattle in relation to the Pied Avocet colony is a double one – preventing disturbance from people and keeping the vegetation at a suitable height for the breeding birds (Figure 12).

However, trampling by cattle has been mentioned as a crucial factor for destruction of nests. This may be a problem, especially when young cattle are set free in spring after a long winter stay indoors. They go all skittish and run over the meadows in all directions and trampling on waders´ nests may occur. After a few days outdoors the flock settles down and its unconscious service as a deterrent to humans and dogs may start. To reduce the destructive trampling of cattle just after the spring release the local cattle keeper lets the flock get used to outdoor life in a paddock nearby for a few days before being let into the nature reserve, its final summer destination.

## 2008 – Successful measures and a good breeding season

The breeding of the Pied Avocet in 2008 was studied very closely from to two hides on the islet, one of which was dug in the ground to provide for ”low level studies” (Figure 7).

Nearly all of the 98 breeding pairs had 2–4 chicks. No four-legged predators were seen on the islet due to the stable water level and the modified electric fence. However, Red Foxes were seen trotting along the fence outside the enclosure. Apparently they are very sensitive to the electricity as they did not get any closer to the fence than 3–4 metres. Thus the combination of an electric fence and a permanent dam to stabilize the water level turned out to be a positive combination to support the breeding Pied Avocets in the area.

The large number of breeding Avocets apparently had a frightening effect on Corvids as no Hooded Crows *Corvus cornix* or Western Jackdaws approached the colony. Some Common Redshanks *Tringa totanus*, Northern Lapwings *Vanellus vanellus*, Eurasian Oystercatchers *Haematopus ostralegus* and Common Ringed Plovers *Charadrius hiaticula*

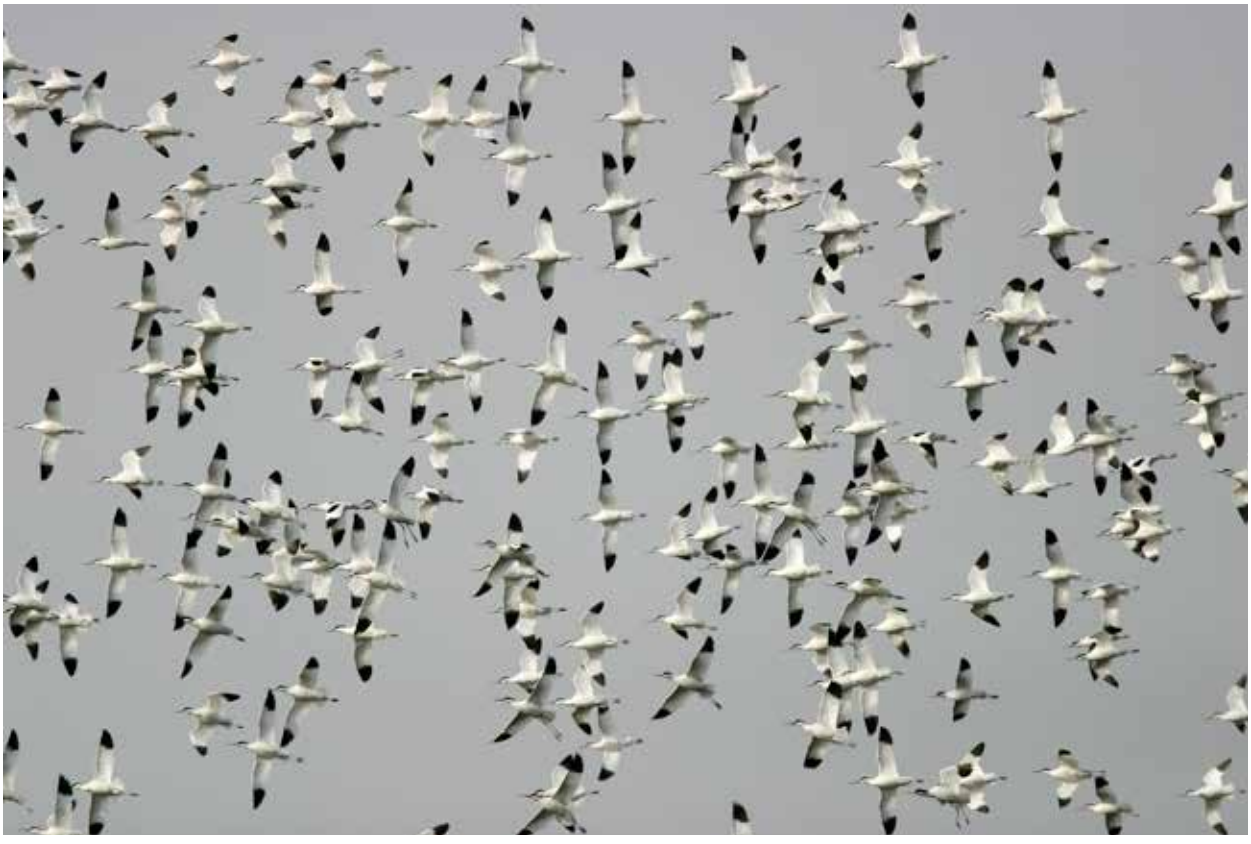

Figure 13. Pied Avocets over Landgrens holme. *Photo: Mikael Arinder/Skånska Bilder.*

took advantage of the collective defence effect of the Avocet colony and bred successfully on the islet (Bentz et al. 2008).

In 2008 egg-laying started around 20th April. Most eggs hatched in the second half of May. Very soon after that the adult birds with chicks dispersed over the western parts of the Falsterbo peninsula. Some late breeders were left behind and by the end of the breeding season Western Jackdaws appeared on stage and predated newly-hatched chicks as the adult bird was still incubating unhatched eggs. Apparently the collective defence did not function at this late stage of the breeding season since most Pied Avocets had left the islet to forage elsewhere with their chicks (see above).

From the hides the movements of the cattle flock across the islet have been studied. At the very first contact with the cattle the Pied Avocets were very upset and reacted with collective diverting behaviour by feigning an injured wing to lead the cattle away from the nests. Later close contact with the cattle did not cause any apparent reaction from the birds. They seemed very relaxed and remained on their nests incubating (Bentz et al. 2008).

In 2008 the Pied Avocets had very good reproduction results on Landgrens holme in Skanör. It has been estimated that more than 100 chicks reached fully-fledged stage. According to the weekly bird counts along the coastline of the Falsterbo peninsula 847 Pied Avocets were seen foraging in shallow water on June 26th. Many of these birds were recently fully-fledged juveniles apparently from the local breeding population. The measures taken had proved very successful.

## The breeding in 2009 – Fatal short circuits

The expectations in 2009 were high. The first Pied Avocets were seen at the breeding site on Landgrens holme as early as March 14th. On March 28th 134 birds (Figure 13) were present and courtship had started. The number of Pied Avocets gradually increased. On April 15th when the first birds were seen incubating a total of 272 individuals were recorded on the islet, many of them still courting and displaying.

Three days later there was a power cut in the electric fence, triggered when the barbed wire got in contact with one of the live wires. The Red Fox took advantage of this power failure

Figure 14. Unhatched Avocet egg with embryo and yolk. *Photo: P-G Bentz/Sturnus.*

during the night, passed the fence, swam to the islet and provided itself with Avocet eggs. Next morning the Avocets were widely spread and seemed restless. Most of the nests were empty, single eggs were spread out over the area and just a few birds were still incubating. Footprints of probably two foxes were found in the mud. Analysis of some damaged eggs showed that they contained a few days old embryos (Figure 14).

The next day about 100 Avocets were still in the area and the following days the number of birds gradually increased to 144.

On April 26th the power was cut once more, due to careless people and a free running dog. The Avocets were dispersed. In the next two weeks Corvids predated the nests that were left.

On 14th May six pairs were found breeding outside the dammed area, but still in the fenced pasture. Next day the area was flooded and the nests destroyed.

Many Avocets stayed in the surroundings and on June 15th 186 birds were recorded. A few of these were incubating. At the end of June four fledged chicks were seen (Bentz et al. 2009).

## A ”lost” breeding season? – New experiences

The electric fence used in 2009 proved to be insufficient. It stretched over 4 km, had two wires, 15–20 cm and 40–60 cm above the ground, and were connected to one single power source. Thus a short circuit will cut the power in both wires.

An additional electric wire on top of the fence (120 cm above the ground) was planned as a future improvement. In between the electric wires run barbed wires as an additional measure to prevent four-legged predators to enter the area.

## 2010 – An unexpected and undesired outcome

Well before the Pied Avocets arrived in early spring, the electric fence was improved. In addition to the two live wires, which were stretched and adjusted, a third electric wire was put up on top of the fence as mentioned above. This measure were taken to prevent foxes to jump over the obstacle.

The first Avocets were seen on the islet March 21st. The total number increased gradually and as many as 350 birds were counted on April 4th. The fence was checked every day and displaying and mating went on undisturbed. Footprints from foxes were only found outside the fence.

This spring egg-laying was late due to the cold and long-lasting winter and low water temperatures. The first incubating birds were not seen until May 1st. The number gradually increased and reached its peak on May 23rd when 122 birds were incubating (Figure 4). Apparently

Figure 15. The 18 meter lift. *Photo: P-G Bentz/Sturnus.*

the egg-laying period was prolonged compared to previous years (Bentz et al. 2011a). A lift was used to count the number of breeding birds and to document the Avocets´ family life (Figure 15).

Compared to previous years the nests were extremely concentrated to the higher parts of the islet, i.e. the central ridge. The reason for this is probably to be found in the fact that the lower parts were very wet due to some intense rain storms around the turn of the month April/ May. This concentration of nests would turn out to be devastating for the breeding success. A high concentration of incubating birds has proved to be a good collective defence when it comes to Corvid predators. But another incident was to influence the breeding in an unfavourable way.

## Resting cattle

On May 22nd 25 cattle were released within the fenced area. They normally behave in a very calm way as they had been in another pasture for some weeks in advance in order to adapt to outdoor life after a long winter in the stable (see above). Grazing cattle in the salt meadows and their trampling of nests have never before proved to be a significant negative factor to breeding success of the Pied Avocet (Bentz et al. 2010).

Incubation progressed, no predation from Corvids or mammals was registered and on 29th May the first two newly hatched chicks were seen.

Again, other bird species took advantage of the Avocets´ collective colony defence and Common Redshanks, Northern Lapwings, Oystercatchers, Arctic Terns *Sterna paradisaea* and Little Terns *Sterna albifrons* were breeding on the islet as well.

On June 5th ten Avocet clutches were seen. On the same day the cattle herd crossed the shallow water to the islet attracted by the fresh grass and the cooling wind (Figure 16). They were grazing for hours and no extensive trampling in nests occurred. This season´s catastrophe happened when the herd stayed overnight on the islet. At dawn the ruminating cattle were found lying down on the ridge with the high concentration of nests. About 50 % of the nests were destroyed on this occasion and many of the rest were ruined the following afternoon when the herd returned to the islet. The few remaining egg clutches became accessible food to flocks of Western Jackdaws which seized the opportunity when the collective defence was more or less erased.

Figure16. The cattle approaching Landgrens holme. *Photo: P-G Bentz/Sturnus.*

Figure 17. Avocet carcass on Landgrens holme on March 31th 2011. *Photo: P-G Bentz/Sturnus.*

After this incident it was decided that in years to come an ”inner defence”, i.e. temporary electrical fencing around the islet during the Avocets´ incubation period should be erased. Hopefully this measure would prove to be the ”final solution” to secure a viable Pied Avocet population in this region.

## The season 2011 – ”Grand Slam” despite a pushing Peregrine

A temporary electric fence with three wires on fibre glass poles were erected in the water around the breeding islet. This inner defence was supposed not only to prevent cattle to destroy nests, but would also stop foxes from reaching the Avocet colony in case the outer electric fence would suffer a short circuit.

But another trouble occurred on the horizon – a second year female Peregrine. On March 25th the first Avocet carcass were found on Landgrens holme (Figure 17). None of the 80 Avocets observed in the morning could be seen around. On April 3rd 124 Avocets were observed when the Peregrine attacked. One Avocet was killed and the Peregrine stayed on the islet for two hours feeding on its prey.

The following day 128 Avocets were back on the islet. The Peregrine was not observed again until April 7th. When it approached, the Avocets panicked and took off. Some birds landed on the water surrounding Landgrens holme and the Peregrine focused on one of them and hit. It pulled its prey down under the water surface and from time to time only the Peregrine´s head was seen above the surface. Surprisingly the wet Peregrine let its prey free after a few minutes and took off from the water and landed in the grass 50 metres away.

Luckily the Peregrine´s visits to the Avocet colony became less frequent and finally the falcon disappeared. The last newly killed Avocet was found on April 28th. After killing at least five Avocets in 25 days there was an increasing fear from the project´s side that a species on the Swedish Red List should spoil successful breeding of one of the target species in spite of all the efforts and measures carried out during the last five years.

The number of incubating Pied Avocets slowly increased and by May 20th 110 nests were counted. During the last week of May

Figure 18. Guided Avocet tours attracted many people. *Photo: P-G Bentz/Sturnus.*

most of the pairs hatched. From the former embankment enthusiastic spectators could follow the Avocets´ fascinating family life, anything from intense conflicts between neighbours to collective defensive behaviour when it comes to chase away low-flying Corvids and Greater Black-backed Gulls *Larus marinus*.

The "Guided Avocet Tours", organized by Falsterbo Bird Observatory and Vellinge municipality within the LIFE-BaltCoast-project twice in May during five consecutive springs, attracted many people (Figure 18). To many people viewing the Pied Avocet colony from the 18 metres high lift was the spring´s climax.

The crossing over the Harbour Road passed without any mishaps in 2011 and no road killed chicks were found. The first full-fledged juveniles were seen 24th June. At that time no incubating birds were left on the islet. The "inner defence" proved to work and was later removed so that the cattle got full access to the tall and fresh grass (Bentz et al. 2011b).

About 95 out of 110 clutches hatched which indicates that the Pied Avocet population had produced at least 200 fledged individuals in the 2011 breeding season. The numbers of breeding pairs and clutches hatched as well as estimated numbers of fledged juveniles in 2007–2011 is shown in Table 1.

**Table 1. The numbers of breeding Pied Avocet pairs, clutches hatched and estimated numbers of fledged juveniles at Landgrens holme 2007–2011.**

| | *Breeding pairs* | *Clutches hatched* | *Fledged juveniles* |
|---|---|---|---|
| **2007** | 50 | 3-4 | unknown |
| **2008** | 98 | 90 | >100 |
| **2009** | 135 | 6 | 4 |
| **2010** | 122 | 10 | >20 |
| **2011** | 110 | 95 | >200 |


## Great support and faith in the future

The measures taken and gradually improved throughout 2007–2011 in order to secure and support the Pied Avocet colony, a well as other bird species on Landgrens holme in Flommen Nature Reserve made the LIFE-project reach the expected goals. Measures like electric fences, permanent dams, speed humps and "avocet crossings" including extensive maintenance, have together with close cooperation with landowners and cattle keepers made it all possible. Guided tours and lectures for the public as well as politicians and officials have, together with distribution of information material to the public and mass media, contributed to the success.

The Pied Avocet colony on Landgrens holme will for years to come serve as a living display over successful nature conservation and restoration work*. At the same time it will contribute to increase the public awareness and knowledge of fragile ecosystems and interactions in a sustainable way.

* The beeding season in 2012 turned out to be the best ever. No less than 202 Pied Avocet pairs bred on Landgrens holme, 190 clutches hatched and the number of fledged juveniles was estimated to exceed 350 – an overwhelming "all time high"!

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