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Sewage sedimentation ponds – a lost bird paradise: a nostalgic return visit and case study

Reningsverkets sedimenteringsdammar – ett förlorat fågelparadis: nostalgiskt återbesök och fallstudie

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Abstract

Sewage ponds with exposed sludge are known to be excellent feeding sites for waders during migration. They still exist in parts of the world but are disappearing in pace with introduction of modern methods which do not involve open exposure of the sludge. Here I report a five-year study from a Swedish plant with open sludge ponds in the 1950s when many similar ones were still active. I counted the waders with frequent visits from 18 April through 2 November, 1952–1956. Ninety-three percent of the dates had a visit in at least one of the years giving an almost complete combined coverage of migration. Nineteen species were recorded at least once. The total average annual number of bird-days was 2868 (5% in spring). Most abundant were the Ruff *Calidris pugnax* with 35% and Wood Sandpiper *Tringa glareola* with 32% of all bird days. Temminck's Stint *Calidris temminckii* showed the highest spring proportion of bird-days, 30%.

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Having little spare time for birding when visiting a foreign city, a travelling birdwatcher knows what to inquire about. How do I find the way to the nearest garbage dump, water work or sewage plant? That's where the birds are! This is still the case in many parts of the world but no longer in wealthier countries. As economies improved things changed. Human health and sanitation as well as an environment without pollutants and excess nutrients became important. New methods of garbage and sewage treatment are now predominant, and neither garbage nor sewage is longer available as feeding stations for birds as they once were.

During the twentieth century, at least the early part, many sewage works had only the primary step of treatment, which involved open sedimentation ponds where the sludge was temporarily deposited to permit biodegradation. Excess water was released into seas, lakes or streams. The degraded and dried sludge was usually used as fertilizer and for soil improvement in adjacent farmland. In the 1950s, fifty percent of the sewage in Sweden was treated in sewage works but only with the primary step (Naturvårdsverket 2000). These sedimentation ponds became excellent habitats for waders because the biodegradation process involves an abundance of many potential food species such as worms (potworms Enchytraidae, sludge worms Naididae particularly *Tubifex tubifex*, and earthworms Lumbricidae), insects, and mites.

There is a number of studies on birdlife in sewage treatment plants and sewage farms. An early one is about British farms by Boyd (1957), and it is worth to cite a part of his introduction: "… modernization of one after the other of these artificial marshes is little short of a calamity, necessary as it may be for the community as a whole. It is because future ornithologists, not fortunate enough to have known these farms in their glory during the last 50 years, may fail to understand their nature and condition, and their fascination for bird and man, that these notes are written." I am writing in the same spirit as it was at about the same time that modernization of the sewage plants began in Sweden. When I started to watch birds in the early 1950s, I was fortunate enough to live only minutes from such a plant. The sewage ponds became one of my most frequented haunts, and during five years I made almost daily counts of the waders during the migration seasons. Many younger bird-watchers will never experience the combined stench from degrading sewage and the wealth of waders feeding on its surface. Hence, it is worthwhile to present this summary from one

of many similar sites, although the counts were made sixty years ago.

Study area

The study area was the sewage treatment works at the municipality of Hallsberg, Örebro county, southern Sweden (approximate centre of the study area: 59°04'15"N; 15°07'30"E). It was delimited by railways in west and south, farmland in the north, and leather industries including a tannery in the east. About ten rectangular ponds were used for the sludge treatment before the water was released into the Rala stream. The area covered by the ponds and some adjacent waterlogged grassland was about seven hectares. One or two large pond received the fresh sludge and other ponds contained successively drier sludge.

Method

The site was carefully surveyed by covering the whole area on foot. Only waders were counted (all species in this report belong to the families Charadriidae and Scolopacidae). The waders were easy to count either when still resting or feeding on the ground or when flushed. Binoculars were used as necessary. The area was small, and all parts were easily accessible and I am certain that no waders that were present could have been missed. Only minor counting errors may have occurred. Records were entered in a notebook at site.

Temporal coverage

The site was surveyed on a variable number of days in each of the five years 1952–1956 (Figure 1, Table 1). The earliest visit was on 22 April and the latest on 2 November, a period of 195 days. The number of years with a visit on a specific date was: 31 (16%) of the dates had a visit in all five years, 30 (15%) in four, 39 (20%) in three, 40 (21%) in two, and 42 (21%) in one year. Only 13 (7%) days were not visited in any of the years. Coverage in the different months was 35% during 22 April–31 May, 27% in June, 65% in July, 86% in August, 80% in September, and 30% during 1 October–2 November. In the different years the coverage was 47%, 64%, 58%, 43%, and 52% of the possible 195 days each year. In total, 514 visits were payed which is 53% of the total number of 975 possible days. But thanks to the fact that the visits were paid on different days in different years, as much as 93% of the dates had a count in at least one of the years.

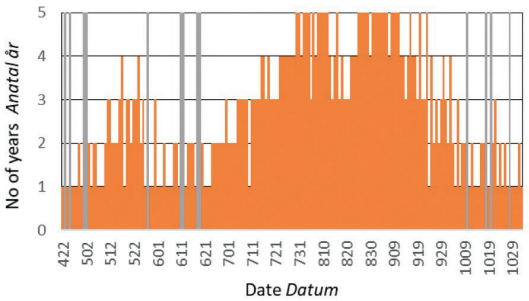

Figure 1. Number of years (maximum all five) with a visit on different dates between 22 April and 2 November. Grey bars represent dates without a visit in any of the five years. Date is given in the form month and day.
Antal år (maximalt alla fem) med besök på olika datum mellan 22 april och 2 november. Grå staplar anger dagar utan besök något av de fem åren. Datum anges som månad och dag.

Table 1. Number of visits in different months and years during the period 22 April–2 November. The percentages are the proportion of days with a visit out of the total number of days in the period (195). Hence, 93% of the days had a visit in at least one of the five years. The same data are shown in Figure 1.
Antal besök olika månader och år under perioden 22 april–2 november. Procentvärdena är andelen dagar med besök av de totalt möjliga under perioden (195). Således hade 93% av dagarna besök under minst ett av de fem åren. Samma data visas i Figur 1.

	22 April –31 May	June	July	August	Sept-ember	1 October – 2 November	Whole period	%
1952	3	19	22	24	15	8	91	47
1953	10	16	27	28	30	14	125	64
1954	23	5	29	30	22	5	114	58
1955	17	0	6	21	26	13	83	43
1956	16	1	17	31	27	9	101	52
All	35	26	31	31	30	29	182	93
%	87	87	100	100	100	88		

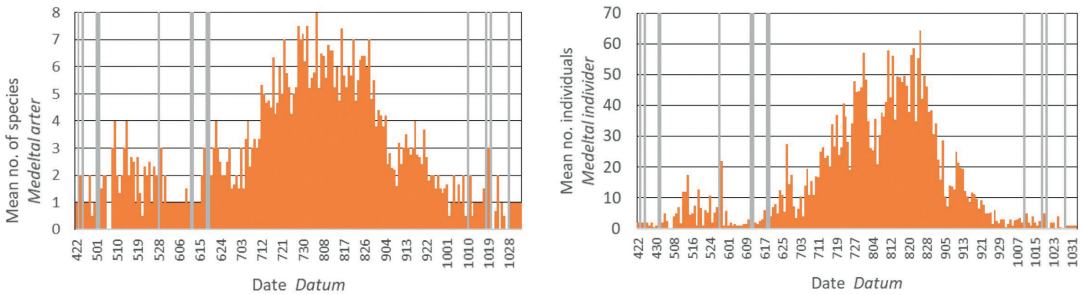

Figure 2. Mean number of species (left) and individuals (right) each date between 22 April and 2 November. Dates without count in any of the years are indicated with grey bars.
Medeltal arter (vänster) och individer (höger) för varje datum mellan 22 april och 2 november. Datum utan besök något året markeras med grå stapel.

Visits were payed at different hours, usually in the early morning or in the evening, but visits were also payed about noon or at any other hour except when dark. Almost all counts were made by myself, but on a few days two friends of mine helped to make the count.

Results

Nineteen species were recorded on at least one day during all five years. In each of the years, the number of species was 16, 16, 16, 17, and 19. The maximum number of species in a single day was 10, 10, 11, 11, and 11, and the maximum number of individuals in a single day was 65, 121, 91, 73, and 60 in 1952–1956, respectively.

The average number of species on each date during all five years is given in Figure 2 (calculated with only days with a visit included). The maximum value was four species in spring and eight species in autumn. There was a period between 12 July and 30 August when an average of more than five species was recorded almost every date.

The average number of individuals (also with only days with a visit included; Figure 2) demonstrated a similar pattern with mean counts of more than 40 waders on most of the dates between 22 July and 27 August. Peak average was 64 waders on 25 August.

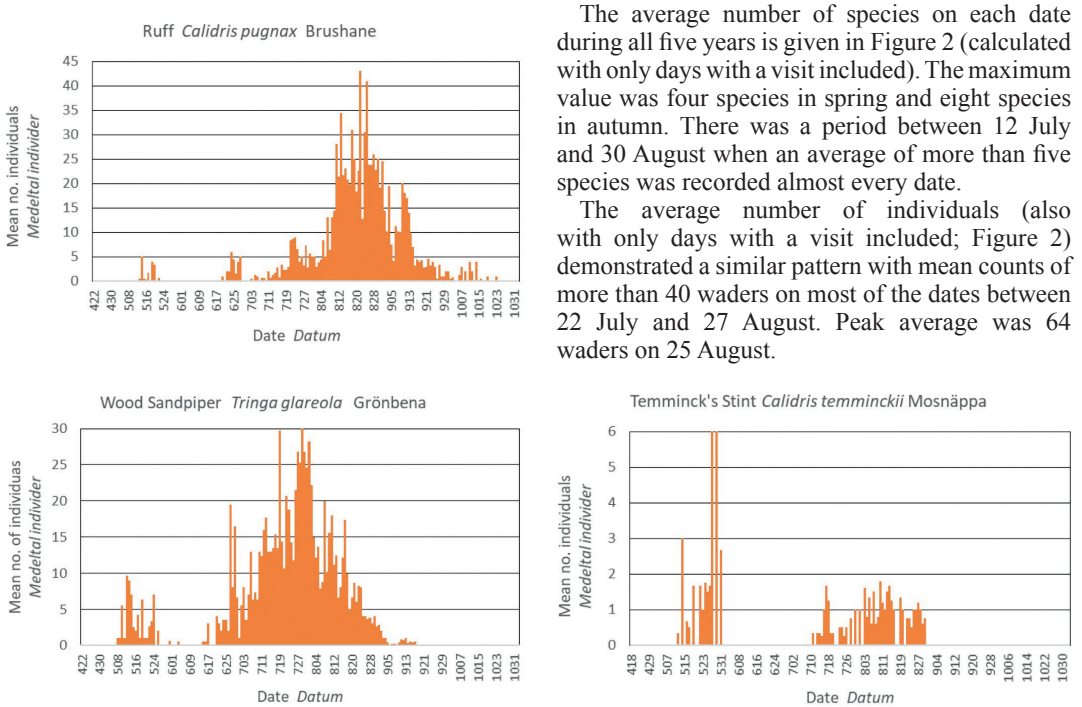

Figure 3. Three examples of mean counts of individuals on different dates: the two most common species, Ruff and Wood Sandpiper, and the only species with comparatively strong occurrence also in spring, Temminck's Stint.
Tre exempel på enskilda arters antal olika datum: de två vanligast arterna, brushane och grönbena samt den enda arten med jämförelsevis stark förekomst även på våren, mosnäppan.

Table 2. Average number of bird-days for different species, for the whole study period and separately for spring and autumn. *Medeltal fågeldagar för olika arter, för hela undersökningsperioden och separat för vår och host.*

	Whole *Hela*	% of all species *% av alla arter*	Spring *Vår*	Autumn *Höst*	% in spring *% om våren*
Lapwing *Vanellus vanellus* Tofsvipa	132	4.6	0	132	0
Grey Plover *Pluvialis squatarola* Kustpipare	0.2	<0.1	0	0	0
Ringed Plover *Charadrius hiaticula* St. strandpipare	23	0.8	3	20	12
Lesser Ringed Plover *Charadrius dubius* Mi. strandp.	116	4.0	12	105	10
Curlew *Numenius arquata* Storspov	13	0.5	0	13	0
Bar-tailed Godwit *Limosa lapponica* Myrspov	3	0.1	0	3	0
Ruff *Calidris pugnax* Brushane	1006	35.1	16	990	2
Curlew Sandpiper *Calidris ferruginea* Spovsnäppa	9	0.3	0	9	0
Temminck's Stint *Calidris temminckii* Mosnäppa	65	2.3	20	46	30
Dunlin *Calidris alpina* Kärrsnäppa	47	1.6	0	47	0
Little Stint *Calidris minuta* Småsnäppa	24	0.8	0	24	0
Jack Snipe *Lymnocryptes minimus* Dvärgbeckasin	21	0.7	0	21	0
Common Snipe *Gallinago gallinago* Enkelbeckasin	158	5.5	1	157	1
Common Sandpiper *Actitis hypoleucos* Drillsnäppa	173	6.0	24	149	14
Green Sandpiper *Tringa ochropus* Skogssnäppa	50	1.7	10	40	20
Redshank *Tringa totanus* Rödbena	10	0.3	0	10	0
Wood Sandpiper *Tringa glareola* Grönbena	931	32.5	67	864	7
Spotted Redshank *Tringa erythropus* Svartsnäppa	36	1.3	0	36	0
Greenshank *Tringa nebularia* Gluttsnäppa	52	1.8	2	49	5
All species	2868		155	2713	5

The spring and autumn migration periods were well separated with few birds during the first two weeks of June. Apart from very few visitors of other species it was the resident Little Ringed Plover *Charadrius dubius* that was regularly observed in early June.

Table 2 provides a summary of the number of "bird-days" for all species, also separately for spring and autumn. The number of bird-days in spring was only six percent of that in the autumn. In terms of total number of bird-days, two species stand out, Ruff *Calidris pugnax* with 35% and Wood Sandpiper *Tringa glareola* with 32% of all bird-days, together with as much as 67%. Third position is taken by the Common Sandpiper *Tringa hypoleucos*, but with only 6% of all bird-days.

Figure 3 provides three examples of daily mean counts of individual species. Two of these species are the two most numerous ones, the Ruff and the Wood Sandpiper. Having somewhat different migration periods, the two-peak pattern of the mean occurrence of all species (Figure 2) is caused by this difference. The third example is Temminck's Stint. This species stands out in being a rather prominent spring visitor compared to its autumn numbers. The number of spring bird-days was 30%. Only the Wood Sandpiper came close to this proportion (20%).

Discussion

In several countries there are a few publications about the birds of sewage treatment plants or sewage farms. Another early one, apart from that of Boyd (1957) cited in the introduction, is that from Cambridge by Nisbet (1957). Another more recent study has been made by Anthes et al. (2002) at Münster. In this case the sewage ponds are no longer used for their original purpose but has been turned into a nature reserve with many open water ponds. A more extensive literature search may have yielded more examples.

When searching for information about wader migration at sewage works in Sweden, I was surprised about finding no compilation of bird records. And this in spite of the fact that numerous bird-watchers must have spent much time at such sites. Consequently, for most former sewage

works it is more or less impossible to reconstruct their importance as feeding sites for waders. The records are probably widely spread in different bird reports, most often as rather anecdotal accounts of unusually large numbers or rare species, or lost altogether.

One example for which some notes exist is the sewage works at Örebro where a new treatment plant was established in the 1950s bordering an attractive site for birding called Oset, the mouth area of Svartån into lake Hjälmaren, an area that was made famous by a book by Rosenberg (1934). At the site there was also a garbage dump and fields of ruderal vegetation, all providing food and shelter for birds all year round. Hence, birdwatchers visited the area frequently, and more ambitious surveys were made at least once a week. Källander (1959) writes for the first time about the waders visiting the new sludge ponds, and later he (Källander 1961, p. 336) presented a summary table of wader counts at "Oset" in the autumn season of 1960; he gives the highest count of each species every autumn week. The bird counts at Oset included walks through grassland, wetland, reeds and a stretch of lakeshore and not only the sludge ponds. However, Hans Källander (in mail) recalls that most of the wader records presented in this particular table must have come from the sludge ponds. With this assumption it is possible to make a simple comparison of the Hallsberg and Örebro ponds. I used the maximum count on any day at Örebro and the five-year average of the maximum counts at Hallsberg for the same weeks. The total of all species maxima was about two times higher at the Örebro ponds (387 vs. 198 at Hallsberg). The two species with highest maxima were the same at both sites (Ruff with peak numbers of 75 vs. 78 and Wood Sandpiper with 63 vs. 55 individuals). But the other species were mostly more abundant at Örebro, particularly Common Ringed Plover (26 vs. 2), Common Snipe (48 vs. 10), Little Stint (32 vs. 3) and Dunlin (50 vs. 5). As there are some uncertainties involved in the Oset counts (only the sludge ponds or also other parts included and the absence of daily counts), it is possible that my study at Hallsberg is the only careful one of sewage sedimentation ponds in all Sweden.

As the sewage plant at Hallsberg is no longer using the sedimentation ponds spontaneous vegetation recovery is going on. In an aerial photo of the area from 2016 one can still see parts of the pond pattern, but there is no open soil, instead reeds, scrub and bushes. A search of the Species Gate (Artportralen.se) for the months May through October, the years 2009–2018, and site "Reningsverket, Hallsberg" produced a predominance of records of Whinchat *Saxicola rubetra,* Thrush Nightingale *Luscinia luscinia*, Marsh Warbler *Acrocephalus palustris*, Sedge Warbler *Acrocephalus schoenobaenus*, Reed Warbler *Acrocephalus scirpaceus*, Grasshopper Warbler *Locustella naevia*, Garden Warbler *Sylvia borin*, Common Whitethroat *Sylvia communis*, Linnet *Linaria cannabina*, and Reed Bunting *Emberiza schoeniclus*, all typical for the current transitional habitat. Only one wader, a Green Sandpiper *Tringa ochropus*, was seen during these ten years! But, obviously, the area is still a haunt for bird watchers!

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Sammanfattning

Soptippar, vattenverk och avloppsreningsverk är omtyckta av både fåglar och fågelskådare. Med bättre ekonomier, ökad hänsyn till människors hälsa och strängare krav på en miljö utan föroreningar och näringsöverskott har nya metoder för att ta hand om avfall införts. Soptippar och avloppsslam är inte längre öppet tillgängliga för fåglar som söker föda. Under nittonhundratalet, åtminstone första halvan, fanns normalt bara det första steget vid avloppsreningsverken, sedimentering och biologisk nedbrytning i öppna dammar. Överskottsvattnet släpptes ut i närliggande vatten och slammet användes som gödning och jordförbättring på angränsande åkrar. År 1950 behandlades hälften av Sveriges avlopp i denna typ av reningsverk, resten renades inte alls. I slamdammarna svarade en rikedom av organismer för nedbrytningen och dessa blev attraktiv föda för fåglar, särskilt vadare som rastade under flyttningen.

Det finns internationellt några, men förvånansvärt få studier av vadarnas rastning vid reningsverk och

mig veterligen inte en enda i Sverige. Därför har jag sammanställt ett femårigt material som jag samlade in vid Hallsbergs reningsverk åren 1952–1956. Vid denna tid fanns åtskilliga liknande reningsverk spridda över landet. Hallsbergs reningsverk låg i östra utkanten av samhället och begränsade av två järnvägar, jordbruksmark och läderindustrier. Slammet behandlades i ett tiotal dammar, som tillsammans med en del vattensjuk gräsmark täckte en areal av ungefär sju hektar.

De aktuella åren räknade jag alla vadare genom att till fots täcka alla dammarna. Området var så överskådligt att inga vadare som fanns på plats vid besöket missades, eventuella fel är räkningsfel. Jag räknade fåglarna under perioden 18 april till och med 2 november, men olika antal dagar olika år. Det framgår av Figur 1 och Tabell 1 hur besöken var fördelade. Tack vare att besöken inföll på olika datum olika år blev resultatet att 93% av de 195 dagar som perioden omfattar hade besök under minst ett av åren. Totalt sett räknades fåglarna under 53% av de 975 möjliga dagarna, åren sammanslagna.

Nitton arter registrerades minst en gång. Artantalet olika år var 16, 16, 16, 17 respektive 19. Högsta antal arter under en enskild dag var 10, 10, 11, 11, 11 och högsta antalet individer under en enskild dag var 65, 121, 91,73, 60 respektive år 1952–1956.

Medeltalet arter och individer olika datum visas i Figur 2 (medeltalen beräknade med enbart dagar med besök inkluderade). Flyttningsperioderna vår och höst var väl åtskilda med få fåglar de två första veckorna i juni. Under dessa veckor var det främst de häckande mindre strandpiparna som räknades.

I Tabell 2 redovisar jag medelantalet ”fågeldagar” för alla arterna, för hela perioden och separat för vår och höst. Två arter dominerade, brushanen med 35 procent och grönbenan med 32 procent, tillsammans alltså så mycket som 67 procent av alla fågeldagar. På tredje plats kom drillsnäppan med 6 procent.

Figur 3 visar tre exempel på medeltal fågeldagar för enskilda arter, de två vanligaste, brushanen och grönbenan, samt den enda vadare som hade jämförelsevis hög förekomst under våren, mosnäppan. Brushanen och grönbenan hade något olika tidsschema, vilket är orsaken till att diagrammet för medeltal individer i Figur 2 har två toppar.

Jag blev litet förvånad över att jag inte kunde hitta någon publicerad mera ingående studie om fåglarna vid något svensk reningsverk. Jag visste från förr att reningsverkens slamdammar var omtyckta lokaler för fågelskådare på många håll i landet. Säkerligen finns det uppgifter spridda i olika fågelrapporter, men det rör sig nog mest om avvikande höga antal eller sällsynta arter. Den mesta informationen, om den alls finns bevarad, ligger dold i privata anteckningsböcker. Det är möjligt att ett mera intensivt litteratursök skulle ha gett ett bättre resultat, men den enda sammanställning jag hittade var en mindre sådan från Oset i Närke där Hans Källander hade gjort en tabell över högsta notering under varje vecka hösten 1960. Det är dock något oklart exakt vad som observerats vid reningsverkets slamdammar och i övrigt i området. Men i brev har Källander meddelat att de flesta vadare bör ha funnits vid reningsverket. Jag gjorde därför en enkel jämförelse baserad på toppnoteringarna för alla arter under samma veckor. Oset befanns ha en summa för toppvärdena som var ungefär dubbelt så hög som för Hallsberg. Brushane och grönbena var vanligast på båda ställena och ungefär lika vanliga på båda. De största skillnaderna till Osets fördel fanns för större strandpipare (13 gånger fler), enkelbeckasin (5 gånger fler), småsnäppa (10 gånger fler) och kärrsnäppa (10 gånger fler).

Slamdammarna vid Hallsbergs reningsverk används inte längre för avloppsrening. Dammarna finns dock fortfarande kvar och mönstret kan ses på flygfoto. Men dammarna täcks nu till stor del av vegetation, vilket framgår av fågelrapporterna i Artportalen. Jag sökte de fågelobservationer som lagts in för under åren 2009–2018, månaderna maj–oktober och lokalen ”Reningsverket, Hallsberg”. Artlistan dominerades av buskskvätta, näktergal, kärrsångare, sävsångare, rörsångare, gräshoppsångare, trädgårdssångare, törnsångare, hämpling och sävsparv. Det är arter som är typiska för marker som spontant håller på att övergå från ett öppet stadium till att bli bevuxna med höga örter, buskar och mindre träd. Men man kan konstatera att även detta stadium är attraktivt för både fåglarna och fågelskådarna