

NORFOLK BIODIVERSITY ACTION PLAN

Little Tern *Sternula albifrons* (formerly *Sterna albifrons*)

Ref:	L/S4	Local Species Action Plan 4
Plan Author:	RSPB (Philip Pearson)	
Plan Co-ordinator:	Coastal BAP Topic Group	
Plan Leaders:	RSPB / NE	
Date: June 2010	Stage: Final	
Plan Duration:	June 2010 – May 2015	

Little terns are grey above and white below, with a black 'cap' and white forehead. They have orange-yellow legs, and a yellow bill with a black tip. They are Europe's smallest tern and one of Britain's rarest breeding seabirds. They are summer visitors to the UK, usually arriving in mid-April and leaving by September. Social nesting colonies are formed on sand and shingle beaches that offer good visibility for predator detection. There are several colonies in the UK, with little terns demonstrating a strong preference for nesting at beach sites on the Norfolk coast. Their diet consists of small fish and invertebrates collected from feeding areas not more than 3-4km from the breeding site.

Little terns lay two to three eggs in a shallow scrape in sand where their eggs are camouflaged among stones. Hatching occurs after 18-22 days and the young are able to leave the nest soon afterwards. Fledging is completed after 19-20 days.

1. CURRENT STATUS

National Status

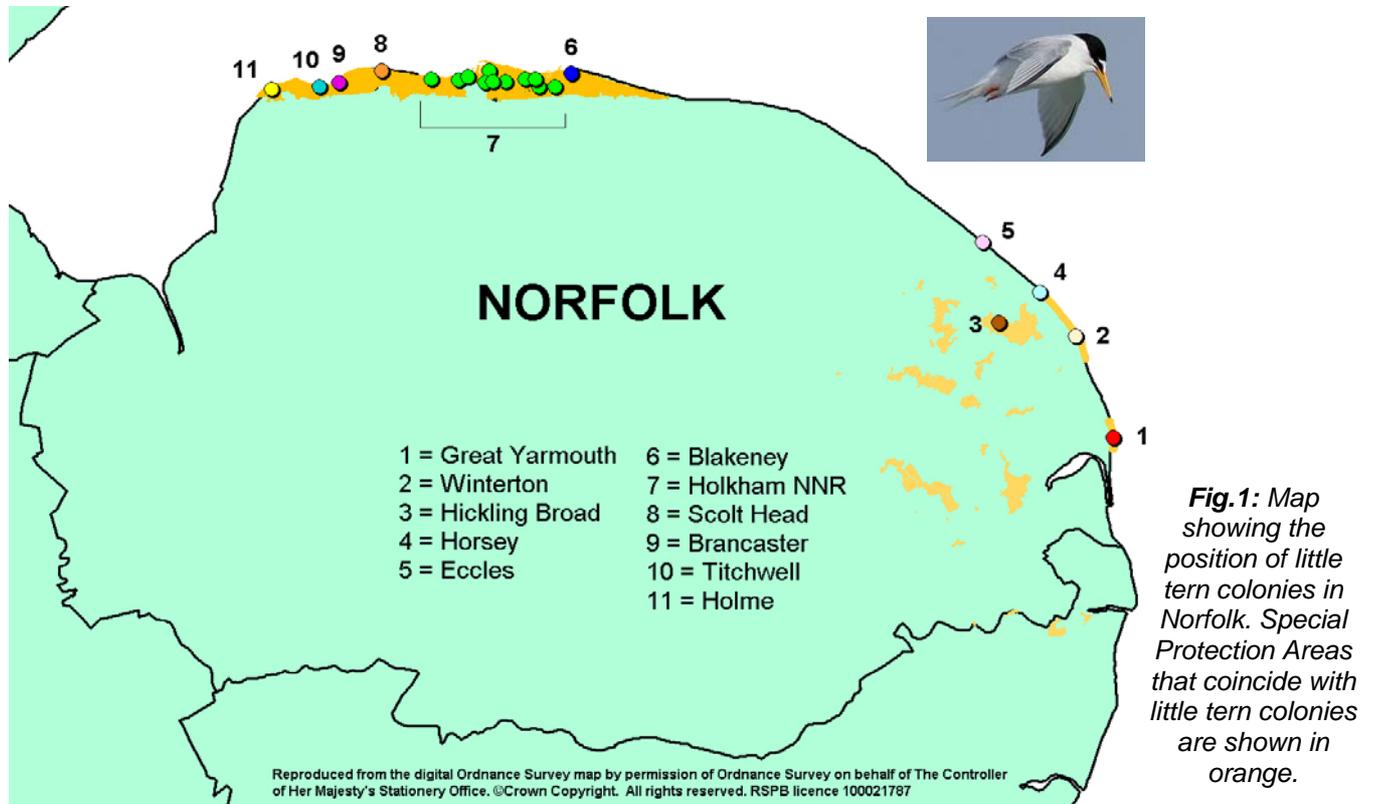
Table 1: Population changes in British little tern colonies, and the proportion of the UK population supported by East Anglian and Norfolk colonies.

Year	UK Population		East Anglian Population			Norfolk Population		
	Count	% Change	Count	% Change	% UK	Count	% Change	% UK
Operation Seafarer (1969-1970)	1608		-	-	-	416	-	26
Seabird Colony Register (1984-1986)	2577	38	1256	-	49	508	18	20
Seabird 2000 (1998-2002)	1947	-24	1010	-20	52	600	15	31

- Little tern colonies are widely but patchily distributed around the UK coast, with East Anglia being an important stronghold (Table 1).
- National censuses show that the population in Britain declined by c. 25% between the mid-1980s and 2002 (Table 1). This rate of decline qualifies it for inclusion on the Birds of Conservation Concern Amber list, based on a moderate rate of decline.
- Little tern is afforded some protection in the UK through its inclusion on Schedule 1 (part 1) of the Wildlife and Countryside Act 1981. In Europe, it is included in the Species of European Conservation Concern (SPEC) list, classified as SPEC 3, meaning moderate continuing decline. Little tern is also listed on Appendix 2 of the Bonn Convention, Annex 1 of the Birds Directive and Appendix 1 of the Bern Convention.

- To maintain their numbers, little terns need to produce a five-year average of 0.67 chicks per pair (Ratcliffe 2003). Most UK little tern colonies have failed to reach this productivity target and are declining.

Norfolk Status



- There are nine main sites in Norfolk where little tern regularly breeds: Great Yarmouth, Winterton, Eccles, Blakeney Point, Holkham NNR (comprising at least nine regular breeding areas, as identified in Table 2), Scolt Head Island, Brancaster, Titchwell and Holme (Fig. 1). In addition, 70 pairs bred at Horsey in 2000 (all records were of birds relaying after being displaced from other sites), whilst there is one record of two pairs breeding at Hickling Broad in 2003.
- Annually, these Norfolk sites have supported at least one third of the UK little tern population (Table 2).
- Increased pressure on beaches has led to a decline in the number of colonies, but not in the number of birds, and so the trend has been towards fewer, larger colonies. Some colonies are on 'second best' sites and may be more at risk from predation and tidal flooding. The North Dene Colony is also currently being squeezed into a smaller area of suitable habitat due to advancing dunes and beach scouring. It is not known whether this is a long term trend or a short term cycle.
- Some Norfolk colonies have exhibited good productivity in recent years. For example: in 2003, productivities of 1.92 and 2.00 were recorded at Winterton and Eccles respectively, in 2006, North Denes achieved 1.82 chicks fledged per pair, and in 2008, the colony at Scolt Head Island achieved 1.21 chicks fledged per pair. These successful colonies help make up for less successful colonies elsewhere, boosting populations in Norfolk and at other UK sites. In the UK context, therefore, the Norfolk little tern population is highly important.

Table 2: Population changes in Norfolk little tern colonies between 2000 and 2009, and the proportion of the UK population that each colony represents. UK percentages are based on data collected from a sample of sites where regular monitoring of little tern populations is possible. **This is likely to be an overestimate however, as some more remote colonies in other parts of the UK are not monitored on an annual basis.** Data compiled from Mavor et al. 2002-2006, Dunmore 2000-2007 and the Seabird Monitoring Programme at: <http://www.jncc.gov.uk/smp/Default.aspx> - accessed 03/06/2009. (^ Sites comprised within Holkham NNR).

Site	2000		2001		2002		2003		2004	
	Pairs	% UK	Pairs	% UK	Pairs	% UK	Pairs	% UK	Pairs	% UK
Great Yarmouth	220	-	265	19	98	7	9	1	17	1
Winterton	19	-	24	2	124-160	9-12	233	18	150	12
Hickling Broad							2	<1		
Eccles					12	1	37	3	47	4
Blakeney	115	-	110	8	85	6	116	9	75	6
Burnham Overy – Stiffkey Binks^	81-86	-								
Stiffkey New East^										
Big Binks^					1	<1			3	<1
Little Binks^			11	1	22	2	4	<1		
Wells Breakthrough^					3	<1				
Wells New Ridge^			48	3	43	3	37	3	11	1
Bob Hall Sands^			4	<1	2	<1	1	<1		
Wells^			3	<1	16	1	4	<1	24	2
Holkham^			25	2						
Burnham Overy-Holkham^					36	3	33	3	26	2
Scolt Head	87	-	90-95	6-7	90-95	7	90	7	90-95	7-8
Brancaster	4		3	<1			3	<1	3	<1
Titchwell			1	<1	5	<1			4	<1
Holme	4	-	11	1	2	<1	15-16	1	9	1
Total	530-535	-	595-600	42	519-560	39-42	574-575	43	459-464	36-37

Site	2005		2006		2007		2008		2009	
	Pairs	% UK	Pairs	% UK	Pairs	% UK	Pairs	% UK	Pairs	% UK
Great Yarmouth	214	18	369	28	261-276	-	350	-	339	-
Winterton	9	1			54-83	-	9	-	87	-
Hickling Broad										
Eccles	36	3			25	-				
Blakeney	50	4	56	4	68	-	101	-	86	
Burnham Overy – Stiffkey Binks^					10	-				
Stiffkey New East^									7	
Big Binks^					1	-				
Little Binks^	2	1	7	1	16	-	7	-	17	-
Wells Breakthrough^					4	-	9	-	17	-
Wells New Ridges^	25	2	24	2	51	-	54	-	15	-
Bob Hall Sands^			18	1	1	-			1	-
Wells^	18	2	1	<1						
Holkham^									10	-
Burnham Overy-Holkham^	17	1	32	2	28	-	28	-	28	-
Scolt Head	105	9	82	6	87-90	-	132	-	123	
Brancaster	5	<1	2	<1	1		2			
Titchwell	3-5	<1								
Holme	12	1	11	1	5	-				
Total	496-498	41	602	46	612-659	-	692	-	730	-

2. CURRENT FACTORS INFLUENCING BREEDING SUCCESS AND SURVIVAL

- **Disturbance:** Little tern occupancy is significantly reduced in areas of high disturbance. In recent years, the East Anglian colonies have been affected significantly by a range of issues including beach users, dog walkers, vandalism and aircraft.
- **Predation:** A large number of predators prey on little tern, of which, red fox *Vulpes vulpes*, carrion crow *Corvus corone*, common kestrel *Falco tinnunculus* and hobby *Falco subbuteo* are the main species. In addition, hedgehogs *Erinaceus europaeus*, mustelids, gulls, other birds of prey, stray dogs *Canis familiaris* and cats *Felis catus* have also been recorded raiding little tern colonies. Oystercatcher *Haematopus ostralegus* has also been seen killing chicks. Many of Norfolk's little tern colonies have experienced poor productivity or failed entirely due to high predation levels.
- **Prey availability:** There is strong evidence that the success of little tern colonies is dependent on having a suitable food supply. Prey availability may be a key factor in colony establishment, but there is limited detailed research on this factor due to surveys being prohibitively expensive. Pre-construction surveys for the Scroby Sands wind farm, however, found that birds typically foraged relatively short distances from the shore: mean values of 38.4m to 139m at Great Yarmouth and mean distances of 277m to 319m at Winterton. It was therefore concluded that colonies should establish in close proximity to high quality, dense food sources.
- **The impact of offshore developments:** Terns may be indirectly affected by the impacts of pile driving on fish prey resources, as reported from wind farms, notably Scroby Sands Wind Farm. Clupeids (mainly Atlantic herring *Clupea harengus* or European sprat *Sprattus sprattus*) are an important resource for terns for improving body condition for breeding, during nest development and during chick provisioning. Clupeids are known to be sensitive to underwater noise, owing to a configuration of hearing apparatus and swim bladder that enables clupeids to be 'hearing specialists'. This potentially renders clupeids vulnerable to lethal effects at close range and reports indicate that for herring, auditory damage may occur up to 3km away. Additionally, strong behavioural disturbance is likely over wider distances, up to 30km, whereby pelagic species such as herring are unlikely to return to their pre-piling locations. Herring spawn in the autumn in the Greater Wash region. Eggs and larvae, which are unable to disperse away from lethal sound levels, will be affected by piling during this period. This could potentially impact on reproduction, with uncertainties in respect to population size and age structure in future years. The impact on fish populations of activities other than piling that generate significant noise should also be considered.
- **The impact of commercial fisheries:** The use of trawling gear, notably for brown shrimp *Crangon crangon*, may reduce prey availability through altering the seabed habitat and the capture of non-target species such as clupeids.
- **The impact of coastal development:** The construction, maintenance and running of various coastal infrastructure, notably ports and wind farms, can impact on breeding species through increased disturbance (people, traffic, noise and light) and reduced prey availability. These effects could reduce the breeding density, breeding productivity, or cause the entire colony to relocate elsewhere.

Coastal processes may also be impacted by construction. Altering sea currents can result in previously accreting beaches becoming eroded, thus the amount of breeding habitat can be considerably reduced. Prey availability may also be reduced if sand banks are lost.

- **Sea-level rise/coastal squeeze:** Many colonies are facing an increasing risk of being washed out due to rising sea-levels, and a reduction in size of breeding beaches due to beach scouring and dune encroachment. This issue may become increasingly worse in the coming years if shoreline management policies do not allow foreshore and beaches to adapt and be resilient to climate change
- **More frequent storm events:** Increased storm events in the future could act to reduce habitat availability.
- **Offshore dredging:** Aggregate extraction within the Humber and Greater Wash marine area and the Norfolk Sandbanks could potentially affect adversely wildlife within an extraction area. Consequently, the prey resources and availability may be reduced, notably where this impacts on clupeid breeding areas.
- **Increased coastal access:** The government is planning to designate the whole of the UK coastline as Open Access land. Unless planned for and managed, this could result in increased disturbance to little tern

colonies around the Norfolk Coast, especially unprotected colonies with no wardening.

- **Egg collecting:** At least one colony has suffered from probable egg collecting in the past ten years. Whilst many of the colonies have wardens and protection schemes in place, this is not for a full 24 hours in most cases, leaving the colonies vulnerable at night.

3. CURRENT ACTION IN NORFOLK

- Great Yarmouth North Denes Special Protection Area (which includes the beach at Winterton-Horsey Dunes SSSI) is designated solely for its breeding little tern colony.
- Most little tern colonies are protected either within nature reserves or through wardening schemes. The North Denes colony currently has 24-hour protection during the breeding season, but all other colonies have wardens present for twelve-hours or less.
- Colonies are fenced to keep human disturbance to a minimum. Electric fences are used to deter predators such as red fox.
- Suitable shelters (for example, a camouflaged pipe partially buried in the sand) are positioned throughout most colonies for chicks to hide in. This affords the chicks greater protection from inclement weather conditions.
- Research at the North Denes colony is investigating the effectiveness of diversionary feeding of kestrels to reduce their impact on chick survival.

4. ACTION PLAN OBJECTIVES AND TARGETS

National

- Maintain a five-year average of 0.67 chicks per pair.

Norfolk

- Ensure the overall Norfolk population does not drop below 650 pairs distributed among no less than fifteen sites (this includes approximately eight breeding areas considered part of the Holkham NNR). This should include maintaining the current annual population size at three established sites during the plan period (2010 – 2015): North Denes (320 pairs), Blakeney (85 pairs), and Scolt Head (95 pairs). Targets may be subject to change due to natural processes affecting site suitability.
- Maintain current range of little tern in Norfolk (approximately twenty 1km squares), with North Norfolk supporting at least nine breeding colonies annually and East Norfolk supporting at least three breeding colonies annually.
- Ensure that all colonies are achieving a five-year average productivity of at least 0.67 chicks per pair.

5. Little Tern – Norfolk Action Plan

	NORFOLK ACTION <i>(High priority actions in bold)</i>	LEAD PARTNER(S)	PARTNERS	DATE
5.1.	<u>Policy and Legislation</u>			
5.1.1	Comment on all development strategies, plans and projects with a potential impact on little tern colonies, to ensure that: <ul style="list-style-type: none"> a) the important sites identified in Figure 1 are protected both during and outside the breeding season; b) mitigation / compensation works create new habitat for little tern, and enhance 	NE	NN, KL, GY RSPB, NT, NWT	On-going

	existing habitat where possible.			
5.1.2	<p>Ensure protective legislation is enforced, and that Local Authorities understand and comply with their legal obligations regarding biodiversity.</p> <p>Effectiveness of enforcement should be assessed annually based on data collected from colony success, condition assessments and Local Authority contributions to little tern work.</p>	NE	RSPB, NT, NWT, NN, KL, GY	2010 onward
5.1.3	<p>Provide input to future local and national policies regarding access to the countryside, to ensure that these do not conflict with little tern conservation.</p>	NE	RSPB, NT, NWT, NN, KL, GY	2010-2012
5.1.4	<p>Seek to secure permanent funding with Local Authorities to fund the conservation of little tern through a range of mechanisms, such as Local Area Agreements, Service Level Agreements, developer contributions and partnership agreements.</p>	NE/RSPB	NT, NWT	On-going
5.2	<u>Site Safeguard and Management</u>			
5.2.1	Continue to warden key sites during daylight hours, and ideally for 24-hours, notably at Great Yarmouth. This is dependent on achieving 5.1.4, as conservation bodies cannot be depended on to fund management in the future given current economic constraints.	NE/RSPB	NT, NWT	On-going
5.2.2	In discussion with reserve managers, seek to recruit and train 5 volunteer wardens annually to support wardens/site managers in managing the colonies.	RSPB/NE/NT	NCP to ensure co-ordinated approach; NWT	Fully implement in 2011
5.2.3	In consultation with NE, explore the possibility of undertaking vegetation management to maintain site suitability for little tern in the short-term, specifically at Great Yarmouth and Winterton.	NE/RSPB	RSPB, NT, NWT	2010-2011
5.2.4	Implement access management (including exclusion zones) at all colonies throughout the breeding season.	RSPB/NE/NT	NCP to ensure co-ordinated approach; NWT	2010 onwards
5.2.5	Evaluate the effectiveness and public acceptance of access management at all sites on an annual basis, and implement improvements as needed.	RSPB/NE/NT	NCP to ensure co-ordinated approach; NWT	2010 onwards
5.3	<u>Species Management and Protection</u>			
5.3.1	Continue to implement predator management at all colonies, where practicable, to improve productivity. Please refer to the ' <i>Management Guidance</i> ' below for suitable control measures.	Landowner/site managing organisation to implement suitable measures at their own site	RSPB, NE, NT, NWT	On-going

5.3.2	If diversionary feeding is shown to be effective at reducing predation by kestrels at the North Denes colony then consider expanding this programme to other sites where practicable.	RSPB	NE, NT, NWT	2011-2012
5.4	<u>Research and Monitoring</u>			
5.4.1	Enter information on an annual basis about the implementation of the Little Tern Action Plan onto the Biodiversity Action Reporting System.	RSPB/NE	RSPB, NE, NT, NWT	2010 onward
5.4.2	Monitor long-term population and productivity trends by collating annual data through Biodiversity Action Recording System (BARS), the Seabird Monitoring Programme (SMP) or other suitable database.	RSPB	NE, NT, NWT	On-going
5.4.3	Provide NBIS with annual data from all Norfolk colonies. Data to be received by December of each year.	RSPB, NE, NT, NWT	NBIS	2010 onward
5.4.4	Seek to identify where prey occurs around the Norfolk coast using available information. This information should be mapped using GIS to identify key areas that may require additional protection within 4km of prey resource, or suitable habitat could be created.	NBIS	RSPB, NE, NT, NWT, ESFJC, Cefas	2011-2012
5.5	<u>Advisory</u>			
5.5.1	Update advisory information in light of new research, notably the results of diversionary feeding to control predation levels. This will be facilitated through sections 5.1 and 5.4.1 above.	RSPB	NE, NT, NWT	2012
5.6	<u>Communications and Publicity</u>			
5.6.1	Promote the importance of little terns in Norfolk to the public during site visits by wardens. Organise at least one public engagement event at carefully selected sites, such as Great Yarmouth, Winterton, and Blakeney Point, from mid-May to August to raise awareness of the importance and vulnerability of little tern. All events to be carefully planned and managed to avoid impacting on the colonies.	Landowner/site managing organisation to take responsibility for event at their own site	RSPB, NE, NT, NWT	2010 onward
5.6.2	Discuss options for erecting interpretation boards at all colonies where access by the public is being managed, to explain the vulnerability of little terns and the reasons for protecting them.	RSPB/NE/NT	NCP to ensure co-ordinated approach; NWT, NN, KL, GY	2011
5.6.3	Discuss options for developing appropriate interpretation material for the public explaining the little tern conservation programme.	RSPB/NE/NT	NCP to ensure co-ordinated approach; NWT, NN, KL, GY	2011
5.6.4	Encourage local support and build up good volunteer support around the coast through community engagement and media releases. Seek to ensure that each of the following includes at least one feature or news item on little tern conservation each breeding season:	NE/RSPB	NT, NWT, SC	2010 onward

	Eastern Daily Press; Norfolk Coast Guardian; Radio Norfolk; North Norfolk Radio.			
5.6.5	Develop a dedicated team of voluntary wardens to oversee all the colonies and support the work of wardens to improve colony protection and productivity. Volunteers to be affiliated with the organisation managing the site, but the project should be co-ordinated at a county level.	RSPB/NE/NT	NCP to ensure co-ordinated approach; NWT	2010 - 2012
5.6.6	Organise one training workshop a year for all new voluntary wardens to cover communication techniques and effective engagement with the public. The legislation protecting little tern should also be covered.	RSPB/NE/NT	NCP to ensure co-ordinated approach; NWT	2010 - 2012
5.6.7	Develop coordinated messages, consistent with the roll-out of Coastal Access provisions, for the whole of the Norfolk Coast to be used with the public visiting sites with little tern colonies to ensure raised awareness and sensitive use of the sites.	EMS/NCP	RSPB, NE, NT, NWT	2010 - 2011
5.6.8	Establish a little tern steering group that meets every two years, or on a needs-be basis, to review work on the little tern colonies and seek adjustments to colony management where necessary to ensure plan targets are met.	NE/RSPB	NT, NWT, NN, KL, GY, NBP	2011 & 2013
5.6.9	Organise a workshop every five years to bring together all the organisations engaged in little tern conservation and protection within Norfolk, to help ensure co-ordinated and effective delivery of the plan. This would facilitate good networking among all parties involved in little tern activities. Seek to include representatives from the wider East Anglian region.	NE/RSPB	NT, NWT, NN, KL, GY, NBP, NCP	2014
5.7	Links with other Action Plans			
5.7.1	<u>Habitat Action Plans:</u> This plan should be considered in conjunction with the action plans for Coastal Dunes and Vegetated Shingle.	Coastal BAP Topic Group		2010 onward

N.B. Where achieve by dates are 'on-going' this means that they need to be achieved or worked towards by 2010 and annually reviewed until 2014. All actions will be reviewed in 2014 in preparation for a revised Action Plan for the period June 2015 – May 2020.

Abbreviations and Acronyms (Organisations)

Cefas	Centre for Environment, Fisheries and Aquaculture Science
EMS	European Marine Site
ESFJC	Eastern Sea Fisheries Joint Committee
GY	Great Yarmouth Borough Council
KL	King's Lynn and West Norfolk Borough Council
NBIS	Norfolk Biodiversity Information Service
NBP	Norfolk Biodiversity Partnership
NCP	Norfolk Coast Partnership
NE	Natural England
NN	North Norfolk District Council
NT	National Trust
NWT	Norfolk Wildlife Trust
RSPB	Royal Society for the Protection of Birds
SC	Sealife Centres – Hunstanton and Great Yarmouth

MANAGEMENT GUIDANCE

(This guidance is a general summary; for more detailed information or advice, please consult the references or contacts below.)

To get the most out of each site currently used by little tern, carefully targeted management is required. Most little tern colonies are protected either within nature reserves or through wardening schemes. The North Denes colony has had RSPB protection by fencing and wardening since 1986. That year, reduced disturbance encouraged 55 pairs of little terns to rear 95 young. Numbers have built up since then, and there are at least 250 pairs most years.

Over recent years there have been a number of studies undertaken on little tern to understand their habitat, foraging, prey and breeding requirements. In Norfolk, much of this work has been undertaken in support of the offshore wind farms that are being proposed and constructed from the Wash to Great Yarmouth. Information gathered through such surveys and work at key sites such as North Denes, Winterton, Blakeney and Scolt Head over the past twenty years have developed a number of key principles that are essential for the success of the Norfolk little tern colonies.

Management Principles for Existing Colonies

- **Habitat:** The best nesting sites consist of suitable areas of mixed shingle and sand, with plenty of marram grass or other vegetation nearby where the chicks can hide. Whilst a small amount of vegetation is good, little tern appear to avoid areas where vegetation becomes too dense, so vegetation management may be necessary. Care should be taken to ensure that such measures do not conflict with conservation objectives for SAC/SSSI dune habitats.
- **Predation management:** Erect electric fences around colonies to limit red fox access. Undertake diversionary feeding of kestrels if trials at North Denes prove successful. Patrol colonies, particularly at night, to identify key predators. Predators such as hedgehogs should be removed by hand and translocated away from the colony. Lethal control of red fox, following Defra/Natural England guidelines, should be considered as a last resort.
- **Access management:** Ensure that colonies are roped off and that visitors have clear guidance on avoiding colonies and the reasons for this. Consider seasonal exclusion zones, particularly in areas frequented by dog walkers.

Management Principles for Creating Little Tern Habitat

- **Prey availability:** Given the relatively small foraging distances moved by little terns from the colony, any proposed new habitat will need to be close to a known food supply to ensure that both the habitat “created” and potential new colony are successful. Information on fish populations, particularly clupeids, should be mapped and used to pinpoint possible sites for establishing new colonies.
- **Create offshore islands:** Dredge spoil could be disposed offshore to create island habitat that attracts birds away from tourist beaches and reduces terrestrial predation. Islands should be designed to be high enough not to be flooded during high tides. These must also be close to a good prey resource, and designed and managed to prevent larger gull species out-competing the terns for breeding space, as well as creating additional predation problems. All opportunities for sourcing suitable material should be considered as they arise.
- **Beach recharge:** The potential for recharging areas of beach that are currently unsuitable, using material sourced from a suitable location, should be considered, either as a short term measure or where biodiversity benefits may be achieved through appropriate coastal flood defence works. All opportunities for undertaking this measure should be considered as they arise, with early engagement in coastal flood defence plans and projects being crucial.

For further information, please contact the organisations listed below.

CONTACTS

The RSPB

Eastern England Regional Office
65 Thorpe Road
Norwich
NR1 1UD
Tel: 01603 661662
Website: www.rspb.org.uk

National Trust

Norfolk Coast Office,
Friary Farm
Cley Road
Blakeney
NR25 7NW
Tel: 01263 740241
Website: www.nationaltrust.org.uk

Natural England (Norfolk & Suffolk Team)

Dragonfly House
2 Gilders Way
Norwich
NR3 1UB
Tel: 01603 674920
Website: www.naturalengland.org.uk

Norfolk Biodiversity Partnership

C/o Norfolk County Council
Martineau Lane
Norwich
NR1 2DH
Tel: 01603 222112
Website: www.norfolk-biodiversity.org

Norfolk Coast Partnership

The Old Courthouse
Baron's Close
Fakenham
NR21 8BE
Tel: 01328 850530
Website: www.norfolkcoastpartnership.org.uk

Norfolk Wildlife Trust

Bewick House
22 Thorpe Road
Norwich
NR1 1RY
Tel: 01603 625540
Website: www.norfolkwildlifetrust.org.uk

Wash and North Norfolk Coast European Marine Site

6 North Lynn Business Village
Bergen Way
Kings Lynn
PE30 2JG
Tel: 01553 772020
Website: www.esfjc.co.uk/ems.htm

REFERENCES

- Bertolero A., Oro D., Vilalta A.M., & López M.À., 2005. Selection of foraging habitats by Little Tern *Sterna albifrons* at the Ebro Delta (NE Spain). *Revista Catalana d'Ornitologia* **21**: 37-42.
- Burfield I., & van Bommel F., 2004. *Birds in Europe: Population estimates, trends and conservation status*. Birdlife International, Cambridge.
- Charlton P., 2003. Habitat creation for little terns. In: Allcorn R.I. (ed.). *Proceedings of a Symposium on Little Terns Sterna albifrons*. RSPB Research Report 8, RSPB, Sandy, pp. 34-41.
- Cramp S., Brooks D.J., Dunn E., Gillmor R., Hollom P.A.D., Hudson R., Nicholson E.M., Ogilvie M.A., Olney P.J.S., Roselaar C.S., Simmons K.E.L., Voous K.H., Wallace D.I.M., Wattle J., & Wilson M.G., 1985. *Handbook of the Birds of Europe, the Middle East and North Africa: The Birds of the Western Palearctic. Volume IV: Terns to Woodpeckers*. RSPB. Oxford University Press, Oxford. pp.120-132.
- Dunmore G., 2001. Norfolk Bird and Mammal Report 2000. Transactions of the Norfolk and Norwich Naturalist' Society 34: 195.
- Dunmore G., 2002. Norfolk Bird and Mammal Report 2001. Transactions of the Norfolk and Norwich Naturalist' Society 35: 195.

- Dunmore G., 2003. Norfolk Bird and Mammal Report 2002. Transactions of the Norfolk and Norwich Naturalist' Society 36: 188.
- Dunmore G., 2004. Norfolk Bird and Mammal Report 2003. Transactions of the Norfolk and Norwich Naturalist' Society 37: 196-197.
- Dunmore G., 2005. Norfolk Bird and Mammal Report 2004. Transactions of the Norfolk and Norwich Naturalist' Society 38: 177-178.
- Dunmore G., 2006. Norfolk Bird and Mammal Report 2005. Transactions of the Norfolk and Norwich Naturalist' Society 39: 193-194.
- Dunmore G., 2007. Norfolk Bird and Mammal Report 2006. Transactions of the Norfolk and Norwich Naturalist' Society 30: 235-236.
- Dunmore G., 2008. Norfolk Bird and Mammal Report 2007. Transactions of the Norfolk and Norwich Naturalist' Society 41: 89-90.
- Eaton M.A, Brown A.F., Noble D.G., Musgrove A.J., Hearn R., Aebischer N.J., Gibbons D.W., Evans A., & Gregory R.D., 2009. Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. *British Birds* **102**: 296-341.
- Gregory R.D., Wilkinson N.I., Noble D.G., Robinson J.A., Brown A.F., Hughes J, Procter D.A., Gibbons D.W., & Galbraith C.A., 2002. The population status of birds in the United Kingdom, Channel Islands and the Isle of Man: an analysis of conservation concern 2002-2007. *British Birds* **95**: 410-450.
- Liley D., 2008. *Little Terns at Great Yarmouth. Disturbance to birds and implications for strategic planning and development control*. Unpublished report commissioned by Great Yarmouth Borough Council and the RSPB. Footprint Ecology, Wareham, Dorset.
- Mavor R.A., Parsons M., Heubeck M., Pickering G., & Schmitt S., 2003. *Seabird numbers and breeding success in Britain and Ireland, 2002*. UK Nature Conservation No. 27. Joint Nature Conservation Committee, Peterborough, pp.74-78.
- Mavor R.A., Parsons M., Heubeck M., Pickering G., & Schmitt S., 2004. *Seabird numbers and breeding success in Britain and Ireland, 2003*. UK Nature Conservation No. 28. Joint Nature Conservation Committee, Peterborough, pp.77-81.
- Mavor R.A., Parsons M., Heubeck M., & Schmitt S., 2005. *Seabird numbers and breeding success in Britain and Ireland, 2004*. UK Nature Conservation No. 29. Joint Nature Conservation Committee, Peterborough, pp.81-85.
- Mavor R.A., Parsons M., Heubeck M., & Schmitt S., 2006. *Seabird numbers and breeding success in Britain and Ireland, 2005*. UK Nature Conservation No. 30. Joint Nature Conservation Committee, Peterborough, pp.82-86.
- Mavor R.A., Heubeck M., Schmitt S., & Parsons M., 2008. *Seabird numbers and breeding success in Britain and Ireland, 2006*. UK Nature Conservation No. 31. Joint Nature Conservation Committee, Peterborough, pp.85-89.
- Mitchell, P.I., & Parsons, M., 2007. *Strategic Review of the UK Seabird Monitoring Programme: Appendix 2 – Impacts of Pressures on Seabirds*. JNCC, Peterborough. Available at: <http://www.jncc.gov.uk/default.aspx?page=1550>
- OSPAR commission, 2009. Overview of the Impacts of Anthropogenic Underwater Sound on the Marine Environment. Available at: http://www.ospar.org/documents/dbase/publications/p00441_Noise%20Background%20document.pdf
- Pascoe., S., & Revill A., 2004. Costs and benefits of bycatch reduction devices in European brown shrimp trawl fisheries. *Environmental and Resource Economics* **27**: 43-64.
- Perrow M., Tomlinson M.L., Lines P., Benham P., Howe R., & Skeate E.R., 2003. Is food supply behind Little Tern *Sterna albifrons* colony location? The case of the largest colony in the UK at the North Denes/Winterton SPA in Norfolk. In: Allcorn R.I. (ed.). *Proceedings of a Symposium on Little Terns Sterna albifrons*. RSPB Research Report 8, RSPB, Sandy, pp. 42-64.

Perrow M., Skeate E.R., Lines P., Brown D., & Tomlinson M.L., 2006. Radio telemetry as a tool for impact assessment of wind farms: the case of Little Terns *Sterna albifrons* at Scroby Sands, Norfolk, UK. *Ibis* **148**: 57-75.

Pickerell G., 2004. Little tern *Sterna albifrons*. In: Mitchell P.I., Newton, S.F., Ratcliffe N. & Dunn T.E. (eds.) *Seabird populations of Britain and Ireland*. T & A D Poyser, London. pp 339-349.

Ratcliffe N., 2003. Little terns in Britain and Ireland: Estimation and diagnosis of population trends. In: Allcorn R.I. (ed.). *Proceedings of a Symposium on Little Terns *Sterna albifrons**. RSPB Research Report 8, RSPB, Sandy, pp. 4-18.

Ratcliffe N., Schmitt S., Mayo A., & Drewitt A., 2005. *Colony selection by little terns in East Anglia*. RSPB Research Report Number 13. RSPB, Sandy.

Robinson R.A, 2005. *BirdFacts: profiles of birds occurring in Britain & Ireland (v1.23, Feb 2009)*. BTO Research Report 407, BTO, Thetford. At: www.bto.org/birdfacts

Slabbekoorn, H., Bouton, N., van Opzeeland, I., Coers, A., ten Cate, C., & Popper A.N., 2010. *A noisy spring: the impact of globally rising underwater sound levels on fish*. **TREE**: in press.

Stoddart A., & Joyner S., 2005. *The Birds of Blakeney Point*. Wren Publications, Sheringham, Norfolk.