Review of evidence for Nature Conservation Sites in the Liverpool City Region

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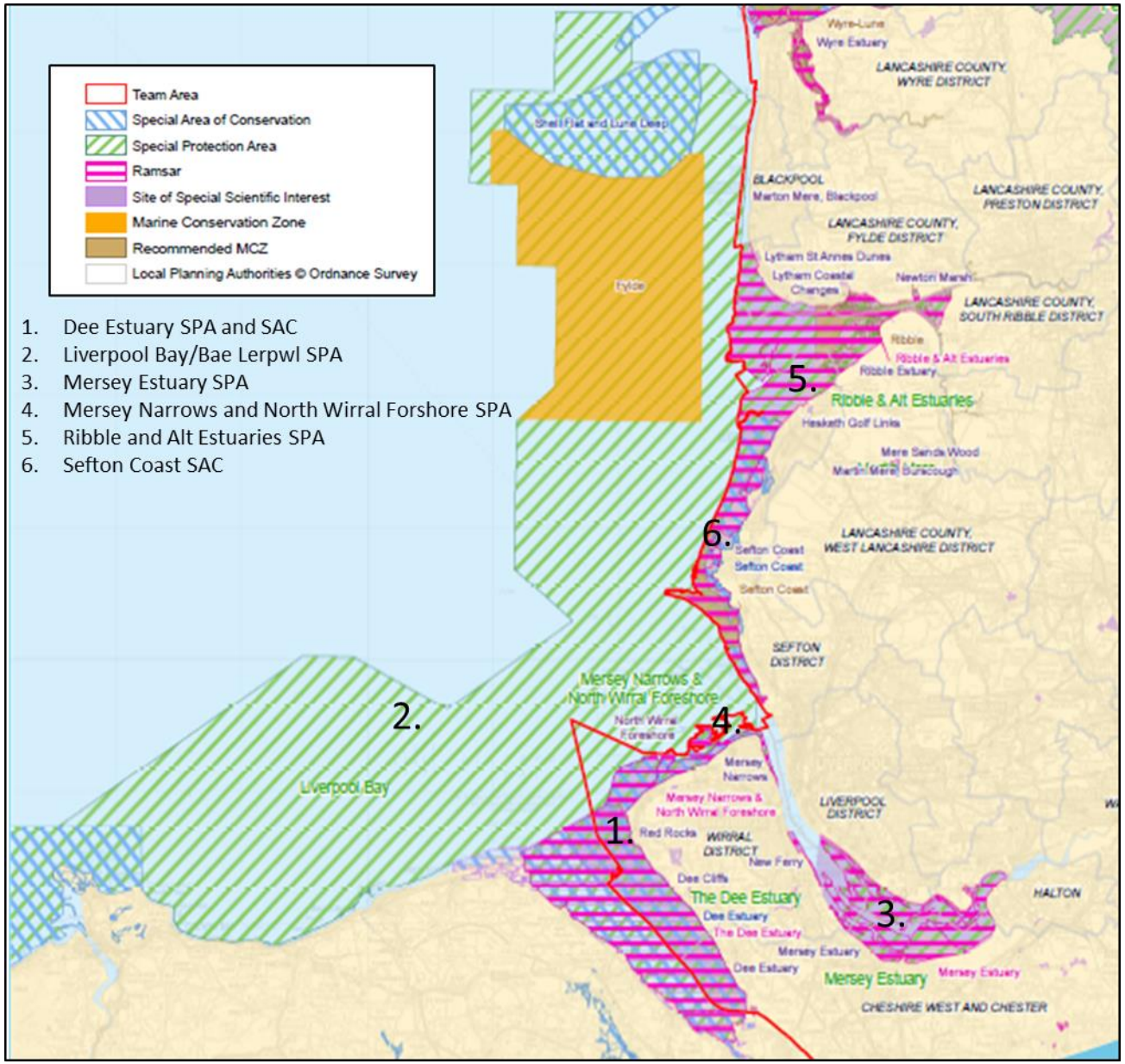
The Task and Context

- Assessment/Review of the evidence relating to Coastal Special Protected Area (SPA's) and Special Areas for Conservation (SAC's) in the Natural England (NE) Cheshire, Greater Manchester, Merseyside and Lancashire Area.

Pearson A. and Bowe C. (2015) Review and development of evidence base of Special Areas of Conservation (SAC's) and Special Protected Areas (SPA's) in the Cheshire and Lancashire Area

- 146 Records in Marine Environmental Data Information Network (MEDIN) compatible spreadsheet
- Information/sources known to Natural England, additional to NE Collection –
- Attempted to review evidence – what we know, what we don't know
- Today – use the review - type and sources of evidence around that are important to the SPA's and SAC's



Adapted from Natural England Coastal Special Areas of Conservation and Special Protection Areas in the Cheshire, Greater Manchester, Merseyside and Lancashire Team Area.

SPA's and SAC's

- Dee Estuary SPA (1)
- Liverpool Bay SPA (2)
- Mersey Estuary SPA (3)
- Mersey Narrows and North Wirral Foreshore SPA (4)
- Ribble and Alt Eutuaries SPA (5)

- Dee Estuary SAC (1)
- Sefton Coast SAC (6)

SPA's – sites of national and European importance for their wader and wildfowl populations classified under the Birds Directive

SAC's – Sites of European importance for species and habitats classified according to the EU Habitats Directive – designated for species or habitats.

Part of the Natura 2000 network

Designation

Features	Dee Estuary SPA	Liverpool Bay SPA	Mersey Estuary SPA	MNNWF SPA	Ribble and Alt SPA
bar-tailed godwit (*Limosa lapponica*)	x			x	x
Bewick's swan (Cygnus *columbianus bewickii*)					x
black-tailed godwit (*Limosa limosa*)	x		x		x
common scoter (*Melanitta nigra*)		x			
common tern (*Strena hirundo*)	x		x	x	x
curlew (*Numenius arquata*)	x				
dunlin (*Calidris alpina*)	x		x		x
golden plover (*Pluvialis apricaria*)			x		x
grey plover (*Pluvialis squatarola*)	x				x
knot (*Calidris canutus*)	x			x	x
lesser black-backed gull (*Larus fuscus*)					x
little gull (*Hydrocoloeus minutus*)				x	
little tern (*Sterna albifrons*)	x		x		
oystercatcher (*Haematopus ostralegus*)	x				x
pink-footed goose (*Anser bachyrhynchus*)					x
pintail (*Anas acuta*)	x		x		x
redshank (*Tringa totanus*)	x		x		x
red-thraoted diver (*Gavia stellata*)		x			
ringed plover (*Charadrius hiaticula*)					x
ruff (*Philomachus pugnax*)					x
sanderling (*Calidris alba*)					
sandwich tern (*Sterna snadvicensis*)	x				
shelduck (*Tadorna tadorna*)	x		x		x
teal (*Anas crecca*)	x		x		x
whooper swan (Cygnus cygnus)					x
wigeon (Anus penelope)					x
waterbird assemblage (supports >20,000 waterbirds)	x		x	x	x
seabird assemblage (supports >20,000 seabirds)					x

Designated features of each SPA. Features highlighted in red are Annex 1 (Annex 1 of the Birds Directive lists. Other features listed are important because >1% of their biogeographic and/or European populations are known to use the SPA. Waterbird Assemblage - sites holds >20,000 waterbirds, generally in the non-breeding season; Seabird Assemblage (breeding) sites holds more than 10,000 pairs of seabirds (i.e. >20,000 individuals)

Qualifying habitats and species for the Dee Estuary SAC (Natural England, 2009).

Qualifying habitats: The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Annual vegetation of drift lines
- Atlantic salt meadows
- Embryonic shifting dunes
- Estuaries
- Fixed dunes with herbaceous vegetation (`grey dunes`)*
- Humid dune slacks
- Mudflats and sandflats not covered by seawater at low tide
- *Salicornia* and other annuals colonising mud and sand
- Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes`)
- Vegetated sea cliffs of the Atlantic and Baltic coasts

Qualifying species: The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex II:

- Petalwort *Petalophyllum ralfsii*
- River lamprey *Lampetra fluviatilis*
- Sea lamprey *Petromyzon marinus*

Annex I priority habitats are denoted by an asterisk (*)

Qualifying habitats and species for the Sefton Coast SAC (Natural England, 2009).

Species name	Resident
Triturus cristatus	Present
Petalophyllum ralfsii	1001-10,000

Annex I habitat	% cover
Embryonic shifting dunes	0.2
Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")	
Fixed dunes with herbaceous vegetation ("grey dunes")	
Atlantic decalcified fixed dunes (*Calluno-Ulicetea*)	
Dunes with *Hippophae rhamnoides*	
Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*)	
Humid dune slacks	

Evidence Sources

WeBs – Wetland Bird Numbers

- WeBs data – JNCC (Natural England), BTO and RSPB – Monitoring Scheme form Nonbreeding water Birds. Set Survey Sites and volunteer network
- Dee Estuary SPA, Mersey Estuary SPA, Mersey Narrows & North Wirral Foreshore SPA and Ribble & Alt Estuaries SPA

Local Trends and Alerts

Cook et al 2013. Wetland Bird Survey Alerts 2009/2010: Changes in numbers of wintering water-birds in the Constituent Countries of the United Kingdom, Special Protection Areas (SPAs) and Sites of Special Scientific Interest (SSSIs*). BTO Research Report 641.* BTO, Thetford, UK.

Reviews of WeBs data commissioned by Natural England

- Analysis of WeBs data and interviews with WeBs counter – Important Roosting and feeding sites and pressures on changes to bird use - *Still et al 2014. Review and analysis of changes in water-bird use of the Mersey Estuary SPA, Mersey Narrows & North Wirral Foreshore SPA and Ribble & Alt Estuaries SPA. BTO Research Report No. 648. The British Trust for Ornithology, the Nunnery, Thetford, Norfolk*

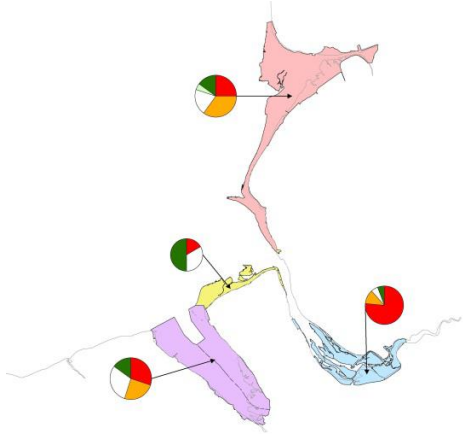
Analysis of Trends

- Aanalysis of trends and comparison to regional and national data. *Ross-Smith et al 2013. Analysis of water-bird population trends in the Mersey Estuary SPA, Mersey Narrows & North Wirral Foreshore pSPA and Ribble & Alt Estuaries SPA. BTO Research Report No. 640. British Trust for Ornithology, Thetford.*

Mersey Estuary SPA Alerts

Species evaluated for Alerts

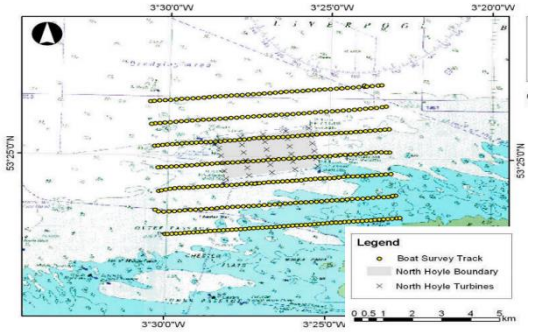
Species	Info	First Winter	Ref Winter	Short-term % Δ	Med-term % Δ	Long-term % Δ	All-time % Δ	% Δ since classification
Shelduck	i	84/85	09/10	-37	-54	-33	–	-57
Wigeon	i	84/85	09/10	-63	-92	-92	–	-95
Teal	i	84/85	09/10	-63	-78	-73	–	-81
Pintail	i	84/85	09/10	-70	-94	-100	–	-97
Great Crested Grebe	i	85/86	09/10	-54	-84	-94	–	-96
Golden Plover	i	84/85	09/10	-90	-92	-76	–	-96
Grey Plover	i	84/85	09/10	12	-21	25	–	-52
Lapwing	i	84/85	09/10	-55	-80	109	–	-70
Dunlin	i	84/85	09/10	-10	-24	50	–	-23
Black-tailed Godwit	i	84/85	09/10	150	-7	2400	–	44
Curlew	i	84/85	09/10	-11	-17	56	–	-10
Redshank	i	84/85	09/10	-54	-66	25	–	-66

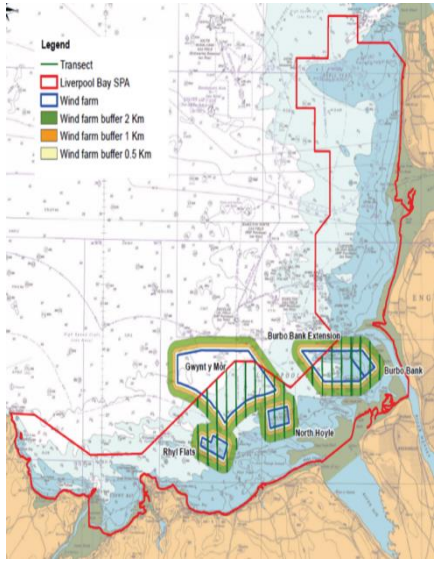


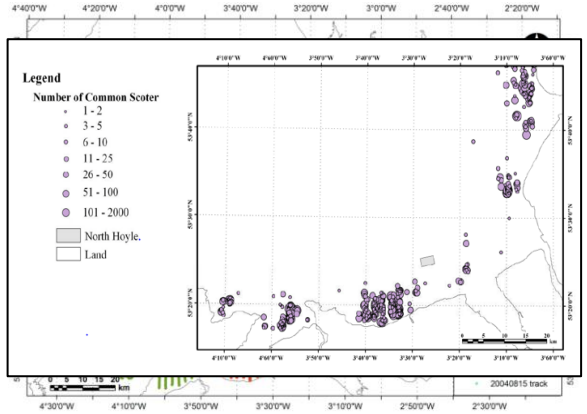
Evidence Sources

Aerial and Boat Bird Survey Data – Liverpool Bay SPA

- Environmental Impact Assessments (EIA) have been commission by windfarms developers as per Environmental Impact Assessment Directive (97/11/EC) – Environmental statements
- Monitoring is also conducted for FEPA (Food and Environment Protection Act) licence process (CEFAS 2004), construction, post construction reports (up to 5 years).
- This has led to an increasing amount of data being collected by boat, visual aerial surveys (2000 -2010) and more recently digital aerial surveys within the Liverpool SPA (2011).
- Visual Aerial surveys (whole of Liverpool Bay) - Wildfowl and Wetlands Trust, but financially supported by windfarm developers.
- Boat surveys (Around the windfarm site + surrounding area) conducted by environmental consultancies at the request of wind farm developers.
- Range of analysis – quantitative and semi qualitative conducted to assess risk (and impact) of displacement, collusion – displacement of flight paths, lighting and impacts on benthic fauna/fish populations
- Bradbury et al. (2014) attempted to combine survey data collected at different windfarms density surface modelling to produce predicted bird densities across a grid covering English territorial waters at a resolution of 3 km x3 km.







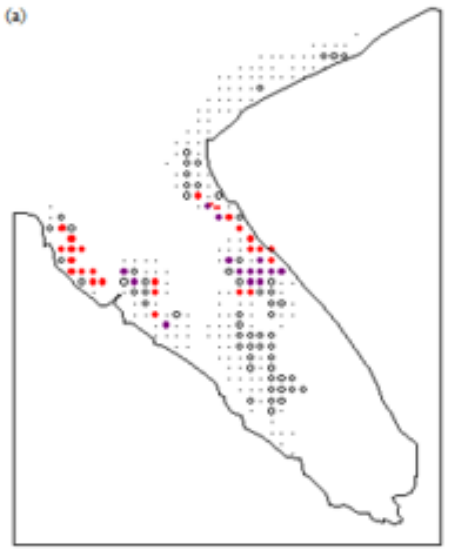
Wind Farm	Report type	Comissioned by	Year of Publication
North Hoyle	Environmental Statement	*Npower Renewables*	2002
	FEPA Baseline monitoring report	*Npower Renewables*	2003
	FEPA Construction Monitoring Report	*Npower Renewables*	2005
	FEPA Annual Monitoring Report 2004 - 2005	*Npower Renewables*	2006
	FEPA Annual Monitoring Report 2005 - 2006	*Npower Renewables*	2007
	Final Annual FEPA Monitoring Report (2006-7) & Five Year Monitoring Programme Summary	*Npower Renewables*	2008
Burbo Bank	Environmental Statement	*Seascape Energy 2002*	2002
Gwynt y Môr	Environmental Statement (Summary)	Npower Renewables	2005
Burbo Bank Extension	Environmental Statement	DONG Energy	2013/2014

North Hoyle was the first UK offshore wind project to complete its FEPA monitoring campaign (Npower 2008).

Evidence Sources

Food Sources Benthic Invertebrates

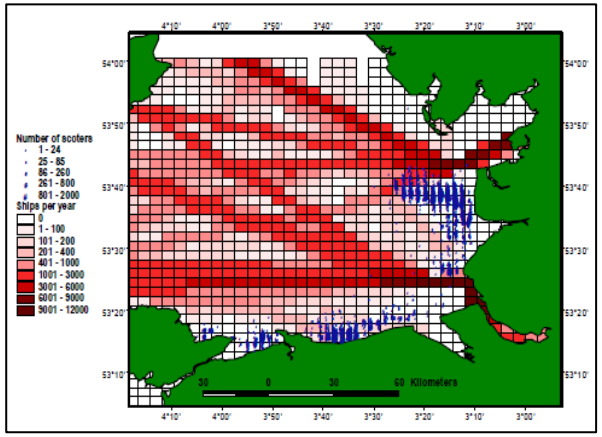
- Dee Estuary:
  - Natural Resources Wales- Cockle and Mussel Stock Survey (2004)
  - Environment Agency AMP3 Benthic Survey Report (2004)
  - Centre for Ecology and Hydrology West et al. (2015) Modelling Shorebirds And Their Food On The Dee Estuary
- Mersey Estuary:
  - Environment Agency (2002) micro-faunal baseline survey and analysis.
- Ribble and Alt:
  - APEM for Natural England - Hubble and Pinion (2014) – Survey - Distribution and extent of sediment type and faunal communities + anthropogenic pressures



Evidences Sources

Potential Disturbances

- Liverpool Bay SPA
  - Ship passage – Kaiser et al 2004 (Spatial data - ships per year)
  - Windfarm environmental statement (Npower 2002; DONG Energy 2013 etc.)
- Mersey Estuary SPA
  - Mersey gateway development - The Mersey Gateway Project - Environmental Statement 1.0
  - Historical Pollution - Reviewed in Environment Agency report 2002 i.e.:
    - EA reports Pope et al 1998 - trace metal levels; Langston et al., 1996 – methylmercury levels.
    - Evidence of Mersey flounder having been exposed to endocrine disrupters – Allen et al.,2000
    - Elevated levels of DDT in Mersey fish as compared with outer Liverpool Bay and Irish Sea - Leah etal., 1997
    - High concentrations of organochlorines in mussels may have become biomagnified in Plaice and Dab within the estuary McNeish et al., 1996.
- Ribble and Alt
  - Still et al 2014 - Survey of WeBs counters – recreational disturbance, transfer of sand for sea defence, Expansion of the salt marsh.
  - Hubble and Pinion – Anthropogenic influences notes (observations adhoc assessment)



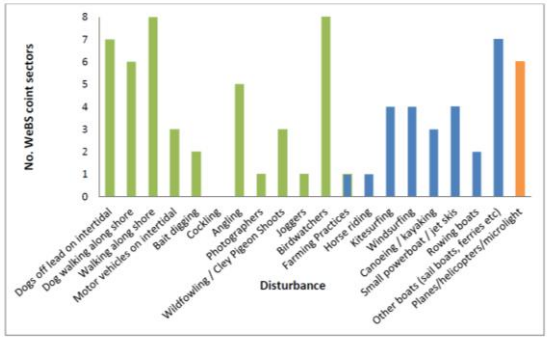
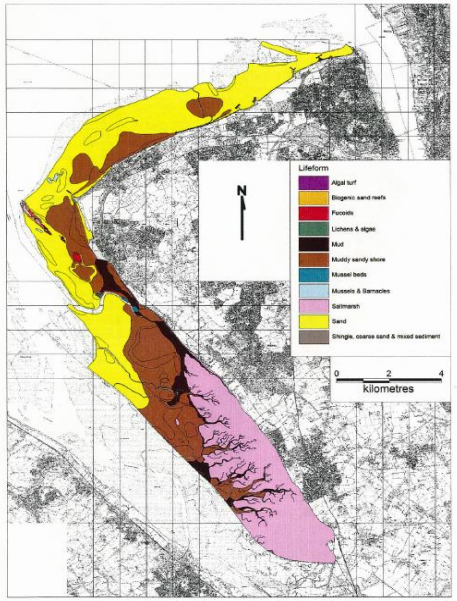


Figure 3.3 Categories of disturbance recorded on WeBS counts within and in the surrounding areas of the Liverpool City Region SPAs. Land-based disturbance types are shown in green, water-based disturbance in blue and air-based disturbance types in orange.

Evidence Sources



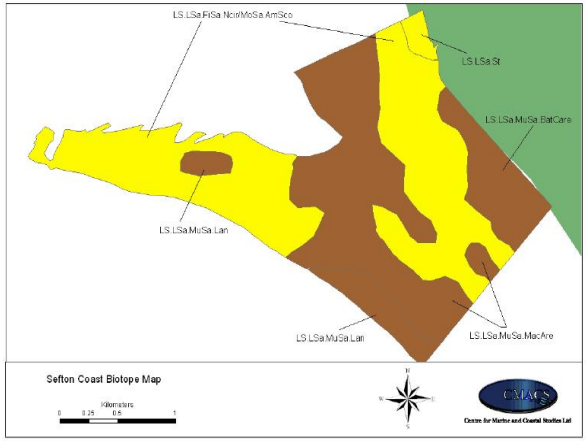
SAC's

Dee Estuary

- Features (Natural England & Countryside Council for Wales, 2010)
  - NVC conducted by Dargie in 2000 (CCW),
  - Fish Survey River Lamprey and Sea Lamprey (CCW) – Potter and Hatton-Ellis 2003
  - Biotope (invertebrate mapping CMACS (2011) for Natural England)
- Disturbances
  - *Spartina anglica* - invasive (Dargie 2001)
  - potential disturbances reviewed in Natural England & Countryside Council for Wales, (2010) – i.e. Pollution Potter 2003 - Interim report on the Dee Estuary AMP3 investigation – Environment agency

Sefton Coast:

- Features (Sand and Shingle Network and Sefton Coast Parternship)
  - Smith (2005) An inventory of vascular plants for the Sefton Coast,
  - Humid Dune Slacks - (John Houston 2008) - Liverpool Hope University
  - North Merseyside Biodiversity Action Plan (Monitoring Reports) Ecological Survey 2004/2005
- Disturbance
  - Climate Change Humid Dune Slacks– Clarke and Sanitwong (UoS) 2007 and Houston (LHU) 2008
  - Invasive species and Exotic garden species (Houston 2008)
  - Recreation (North Merseyside Biodiversity Action Plan, 2006)
  - Erosion (North Merseyside Biodiversity Action Plan, 2006)



Formal Documents

JNCC Data Forms

- 2006 Ribble & Alt Estuaries SAC
- 2006 Mersey Estuary SPA
- 2010 Liverpool Bay SPA
- 2011 Dee Estuary SAC & Dee Estuary SPA.
- 2011 Mersey Narrows & North Wirral Foreshore.
- 2011 Sefton Coast SAC.

Natural England Conservation Advise Packages

- 2015 – Mersey estuary
- 2015 - Mersey Narrows and North Wirral Foreshore SPA
- 2015 - Ribble & Alt estuaries SPA
- 2010 - Dee Esturay SPA and SAC (Natural England & Countryside Council for Wales)

Key things to note

- Liverpool SPA:
  - Inconsistency of methods and data type use in the various environmental statements and monitoring reports, make comparison difficult between reports and different wind farms This makes it difficult to compare analysis across environmental statement and monitoring reports from different windfarms within Liverpool SPA.
  - Studies to estimate density dependent mortality of red throated diver (currently
  - There has been a significant development of methods applied to analyse this data in Environmental Statements –North Hoyle (Npower 2002) to Burbo Bank (DONG energy 2013/2014) from semi qualitative assessment of risk - to more quantitative analysis of impact. Still some subjectivity in overall impacts – based on Percival's (semi quantitative index) - 2001
- Dee Estuary SPA and Mersey Estuary SPA
  - WeBs data highlight site specific population declines – it is not clear what is causing these – i.e. Dee Estuary - knot and pin tail, Mersey Estuary – redshank and pin tail
  - Effects of historical pollution on bird populations
  - Lamprey numbers
- Mersey Narrows & North Wirral Foreshore SPA
  - No quantitative data is available on disturbances and effects on individual species
- Sefton coast SAC
  - work driven by University Network (more sources outside NE collections)

Active Research

- The Sand dune and Shingle Network (LHU) - Sefton Coast Due System
- TEP (Assessment of Supporting habitat of features – Docks MEAS – Bird Surveys (based in WeBs methods)
- Thomson Ecology IPENS – Recreation as disturbance to bird species Mersey Narrows & North Wirral Foreshore SPA
- ICOASST – University of Liverpool, University of Southampton, University of Machester, University of Swansea, UCL, University of Oxford, BGS and HR Wallingford - integrating COASTal Sediment Systems
- Natural England – Land functionality in relation to SPA bird features
- Environment Agency and North West Regional monitoring Group – North West and North Wales Shoreline Management Plan 2 – Surveys on salt marsh extent, bathymetry and LiDAR

iCOASST
integrating coastal sediment systems