

Pre and Post Construction monitoring and stake holder involvement of on-shore turbines adjacent to Severn Estuary Ramsar Site

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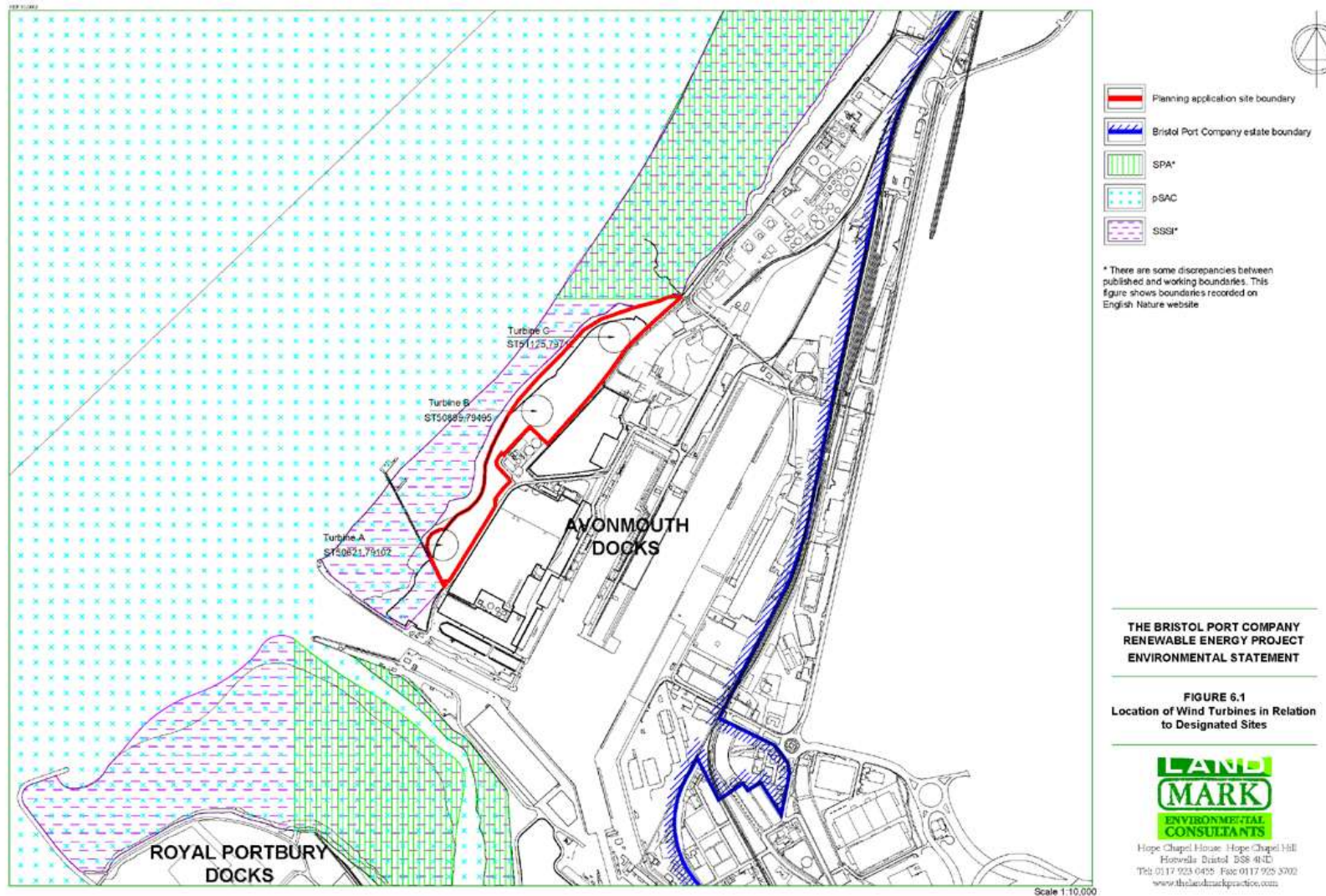


ecotricity

- Mission led ‘not for dividend’ - business model *“to change the way energy is made and used in the UK by turning bills into mills”*
- To maximum environment gain for minimum environment impact
- In any apparent conflict between the environment and money – we put the environment first.
- We take into account ethical and social issues, biodiversity and sustainability when making all strategic and operational decisions
- See www.ecotricity.co.uk



Site Location



Severn Estuary SPA/Ramsar

Internationally important for :

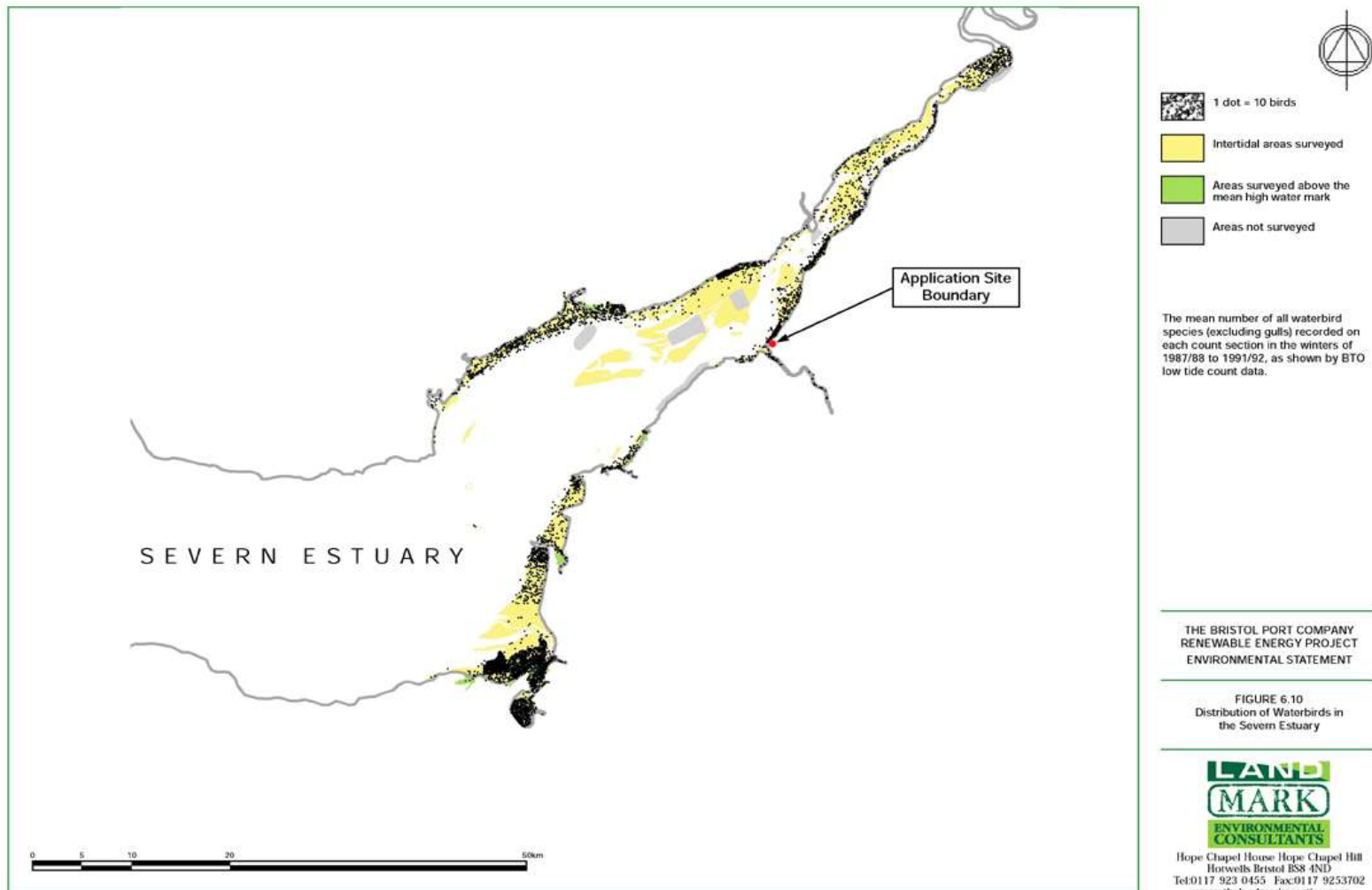
- Bewick's swan
- European white-fronted goose
- Shelduck
- Gadwall
- Dunlin
- Redshank

Nationally Important for : Wigeon, Teal, Pintail, Pochard, Tufted duck, Ringed plover, Grey plover, Dunlin, Curlew, Whimbrel, Spotted Redshank, Redshank

Also over 90,000 Gulls



Distribution of waterbirds

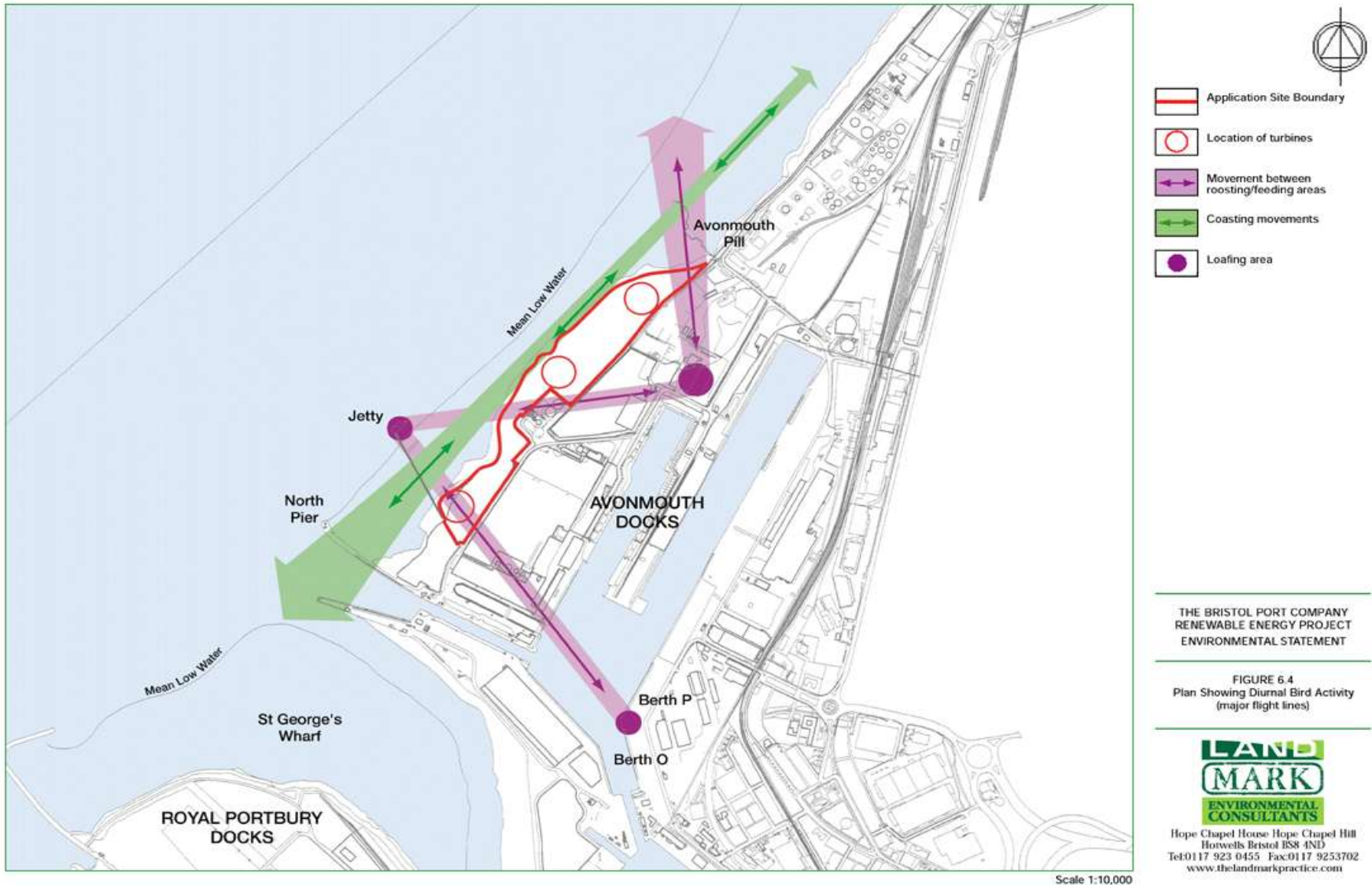


Source: BTO Research Report No 335, November 2003

Pre-Construction Monitoring(2004, 2006/7)

- Vantage Point Surveys (108 hrs)
- (plus night 11, inclement weather 2 , migration surveys 13)
- Disturbance surveys (12)
- Breeding Bird Surveys

Flights detected pre-construction



Pre construction VP

Species	Flights/hour	% of flight at rota height
Herring Gull	37	19
Black-headed gull	34	55
Linnet	18	0
L BB gull	4	9
Cormorant	3	15
Feral Pigeon	2	21
Meadow Pipit	1	5
GBB gull	1	40
Passerine sp	1	6
Shelduck	< 1	9
Ringed Plover	< 1	0
Peregrine	< 0.1	50
Kestrel	<0.1	100
Redshank	<0.1	0
All Species	112	26



Pre- Construction Estimated Mortality

Species	Annual mortality per turbine	
	99% avoidance	95% avoidance
Cormorant	0.06	0.29
Herring gull	0.90	4.51
Lesser black-backed gull	0.04	0.23
Black –headed gull	2.01	10.04

Permission granted for three Enercon E82 turbines:

Dimensions : 79m to hub, 41m blade (82 diameter)

Planning Conditions

10. Prior to the commencement of development, details of an ecological monitoring strategy to assess the impact of the turbines on mortality and disturbance to birds in the area shall be submitted to and approved in writing by the Local Planning Authority. Monitoring shall take place for a minimum of 5 years (with the ongoing programme of monitoring reviewed after two years) from the date of the commencement of the operation of the turbines. The monitoring strategy shall include the following details:
- (i) Purpose of monitoring;
 - (ii) Monitoring aims and objectives;
 - (iii) Targets and performance standards to be monitored;
 - (iv) Indicators to be used in monitoring;
 - (v) Data gathering and analysis;
 - (vi) Location of monitoring;
 - (vii) Timetable and timing of monitoring;
 - (viii) Responsible persons;
 - (ix) Review of monitoring results;

Advisory Panel

Bristol City Council (Chair)

Natural England

Avon Wildlife Trust

RSPB

Bristol Ornithological Club

Bristol Naturalists

British Trust for Ornithology

National Trust

The Landmark Practice

The Bristol Port Company

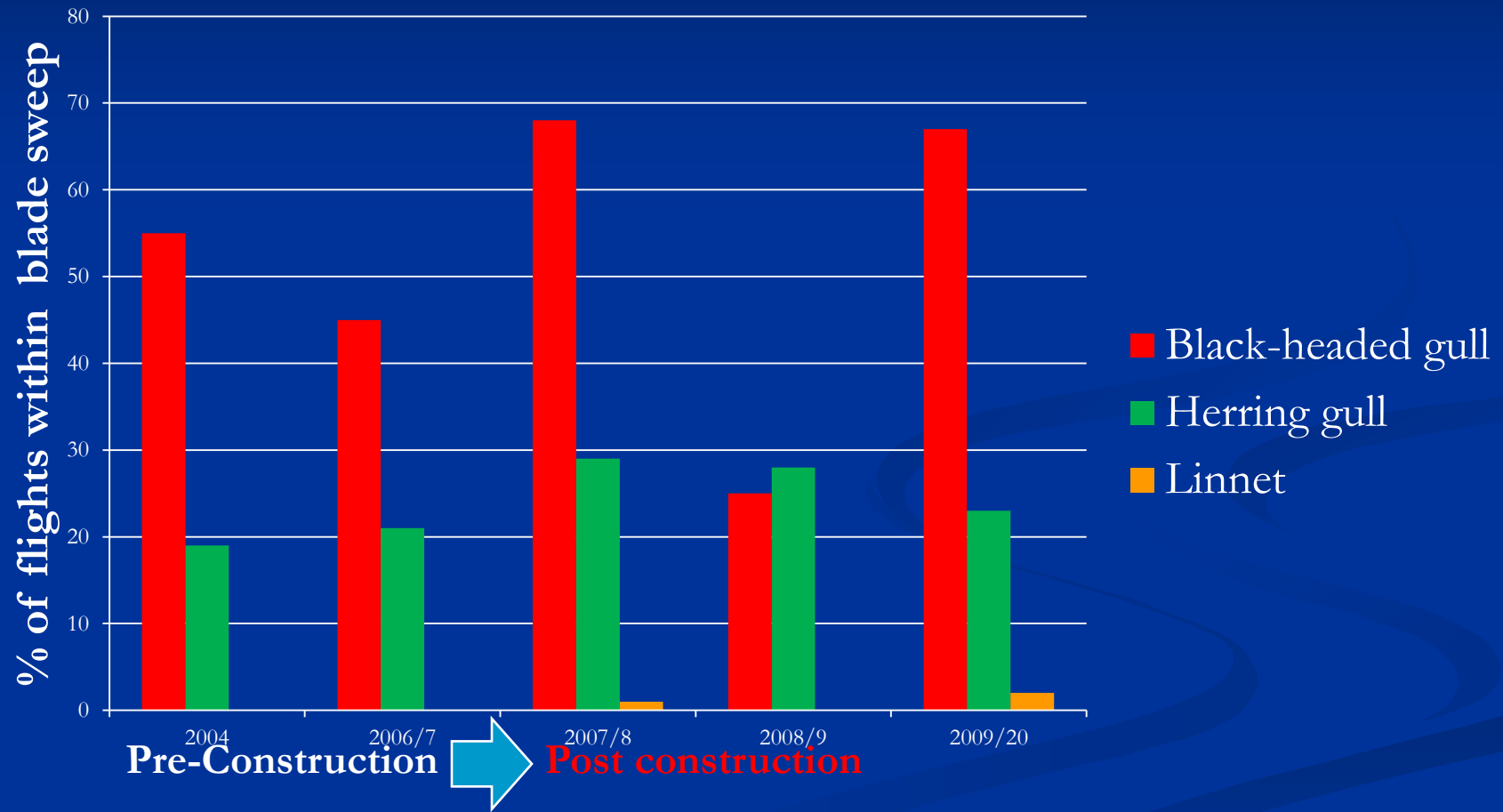
Ecotricity (Secretariat)

**Developed monitoring and reporting strategy
(years 1,2,3,5,10,15,20) , met every 4 months in first 2
years then annually**

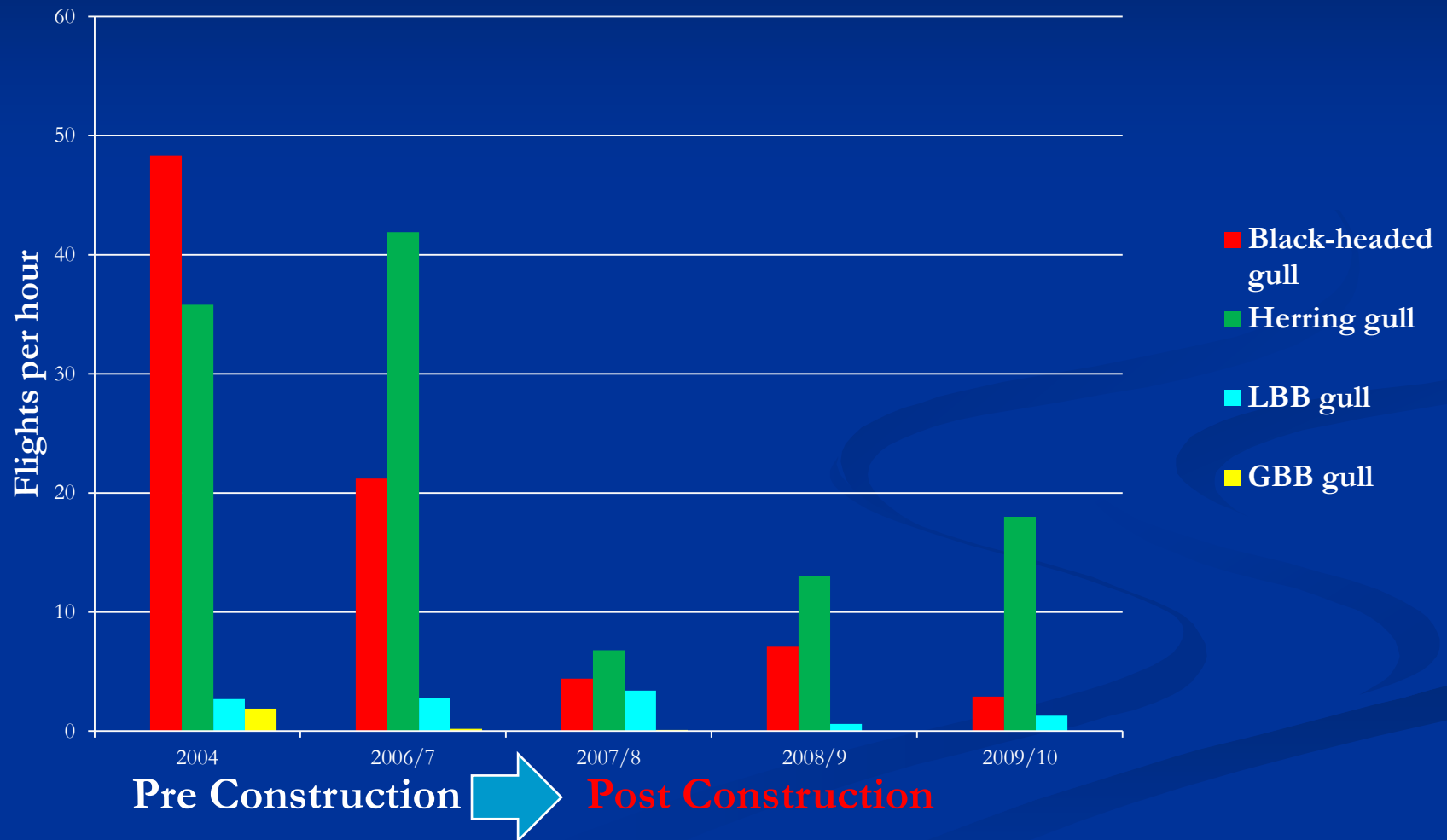
Post Construction (2007/08, 2008/09, 2009/10)

- Vantage Point Surveys (324 hrs)
- Disturbance surveys (36)
- Ringed Plover Breeding
- Collision watch surveys (394 hours)
- Ground Surveys year 1 alternate days, then after high risk conditions: high wind, fog, heavy snow, migration passage: Total of 306 searches per turbine

Altitude of Bird Transits



Bird Transit Rate



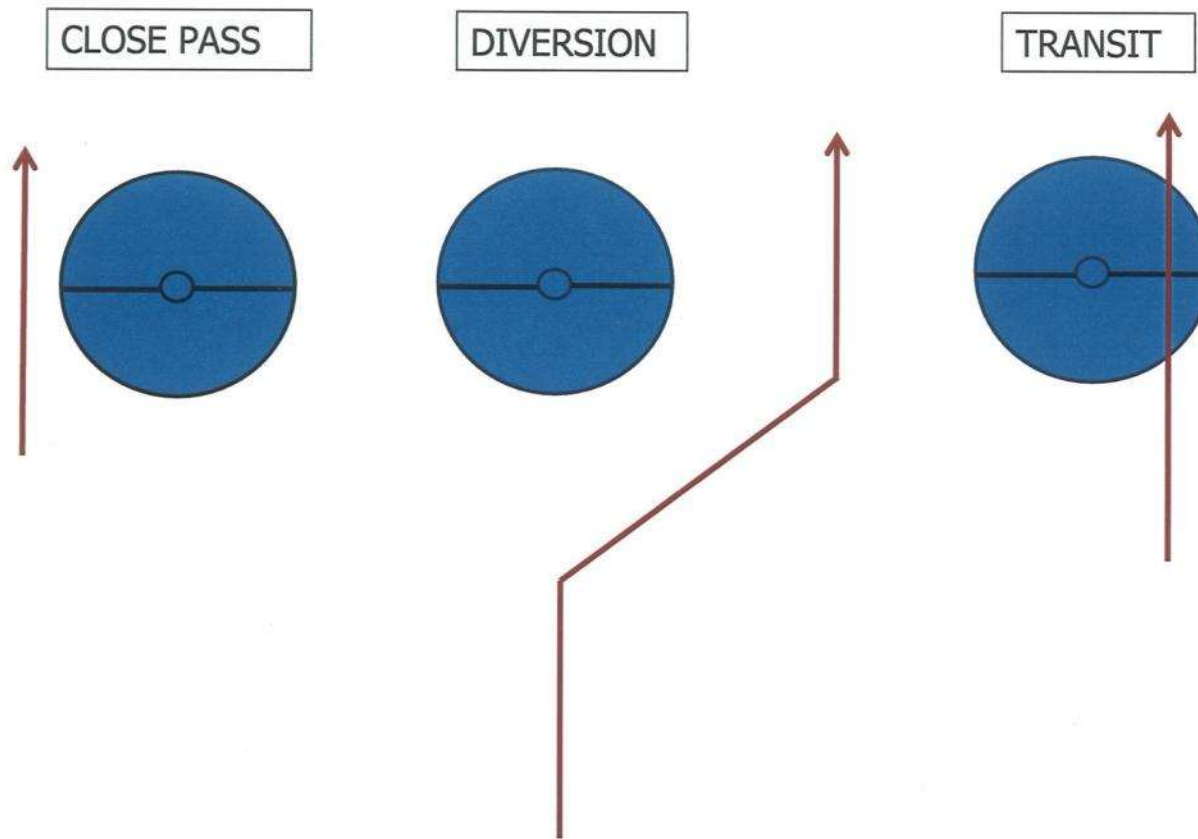
Search efficiency (100%) and predator removal (virtually zero)



Original mortality estimate (Orig), modified estimate (MM) and recorded mortality

Species	Annual Mortality per Turbine				
	99% avoidance		95% avoidance		Recorded mortality
	Orig	MM	Orig	MM	
Cormorant	0.06	0.03	0.29	0.15	-
Herring gull	0.90	0.27	4.51	1.48	-
Lesser black-backed gull	0.04	0.02	0.23	0.12	0.1
Black –headed gull	2.01	0.28	10.04	1.40	0.1

Bird Turbine Interactions



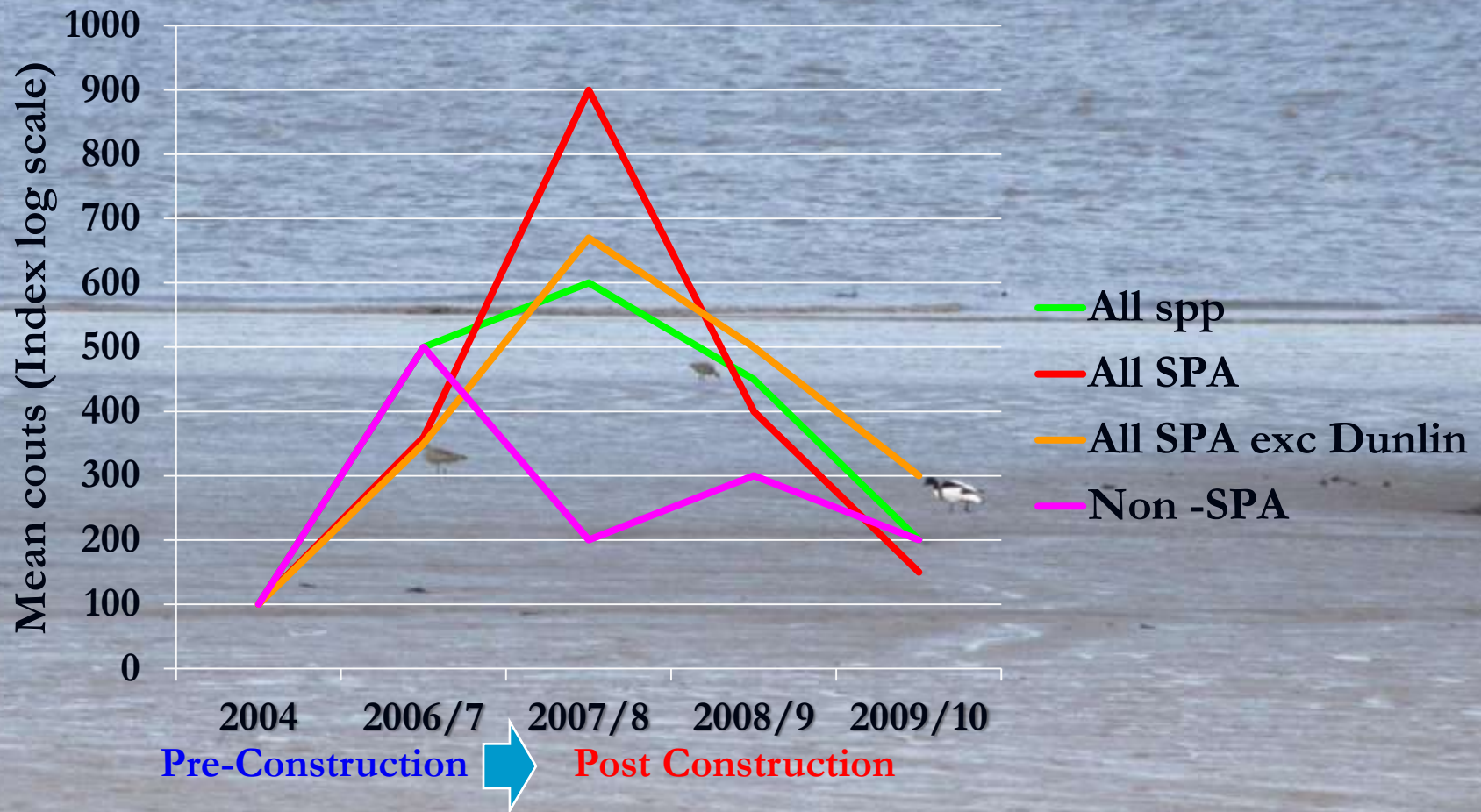
Bird Turbine Interactions (394 hrs)

Species	Close Pass (%) No Diversion	Diversion (%)		Transit through blade sweep		(n)
				Avoidance (%)	No Avoidance (%)	
	Within 40m	Early >80m	Late <80m	Successful	Successful	
B headed gull	75.0	6.3	9.3	3.1	6.2	32
C Crow	20.0	-	80.0	-	-	5
Cormorant	41.7	25.0	33.3	-		12
Herring gull	51.5	21.2	24.2	3.0	-	33
LBB gull	71.4	14.3	14.3	-	-	7
Linnet	88.3	11.7	-	-	-	17

Starlings : Continued to use roost on old jetty roost, approximately 2 million flights per annum, below blade sweep, no recorded casualties

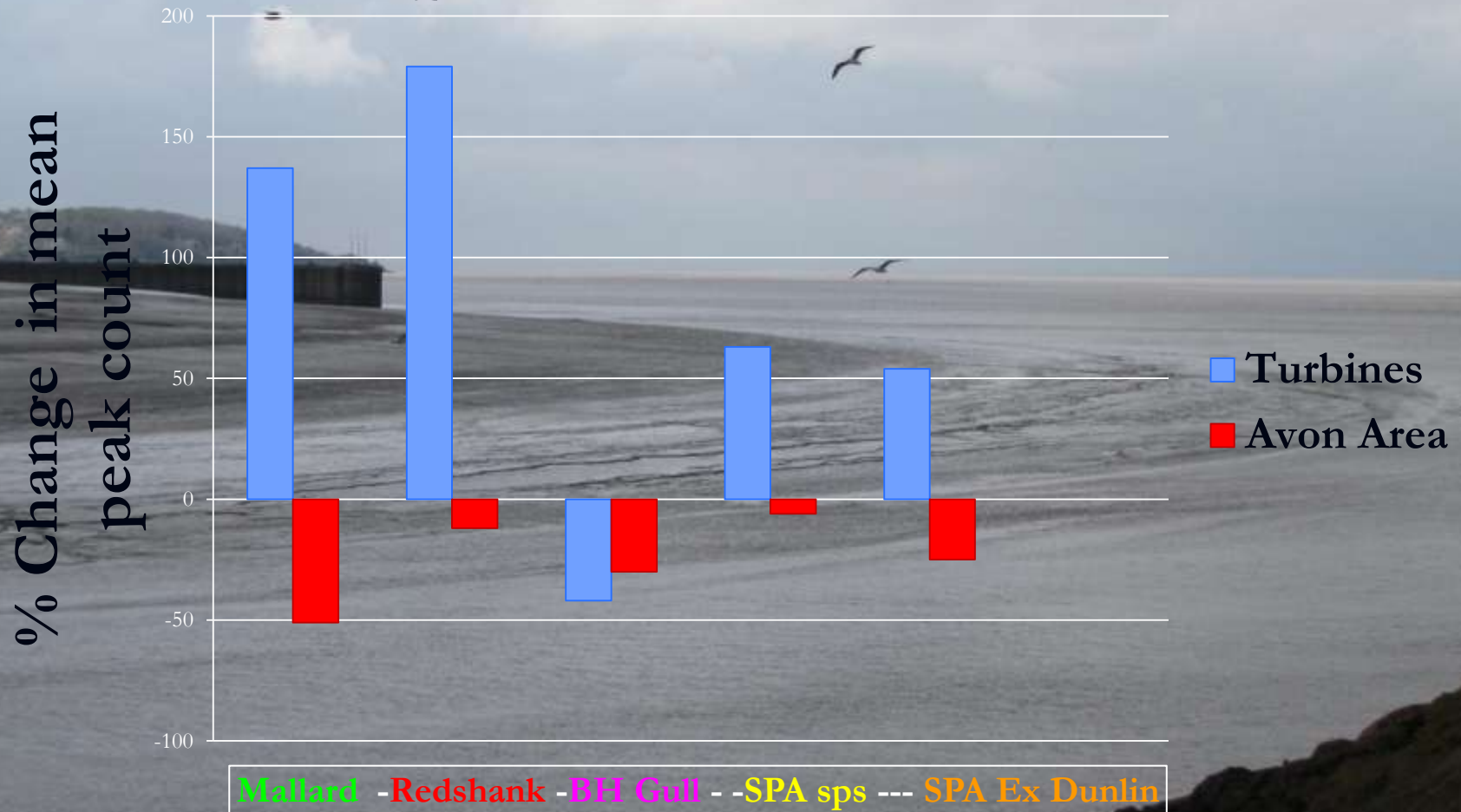


Foreshore Disturbance



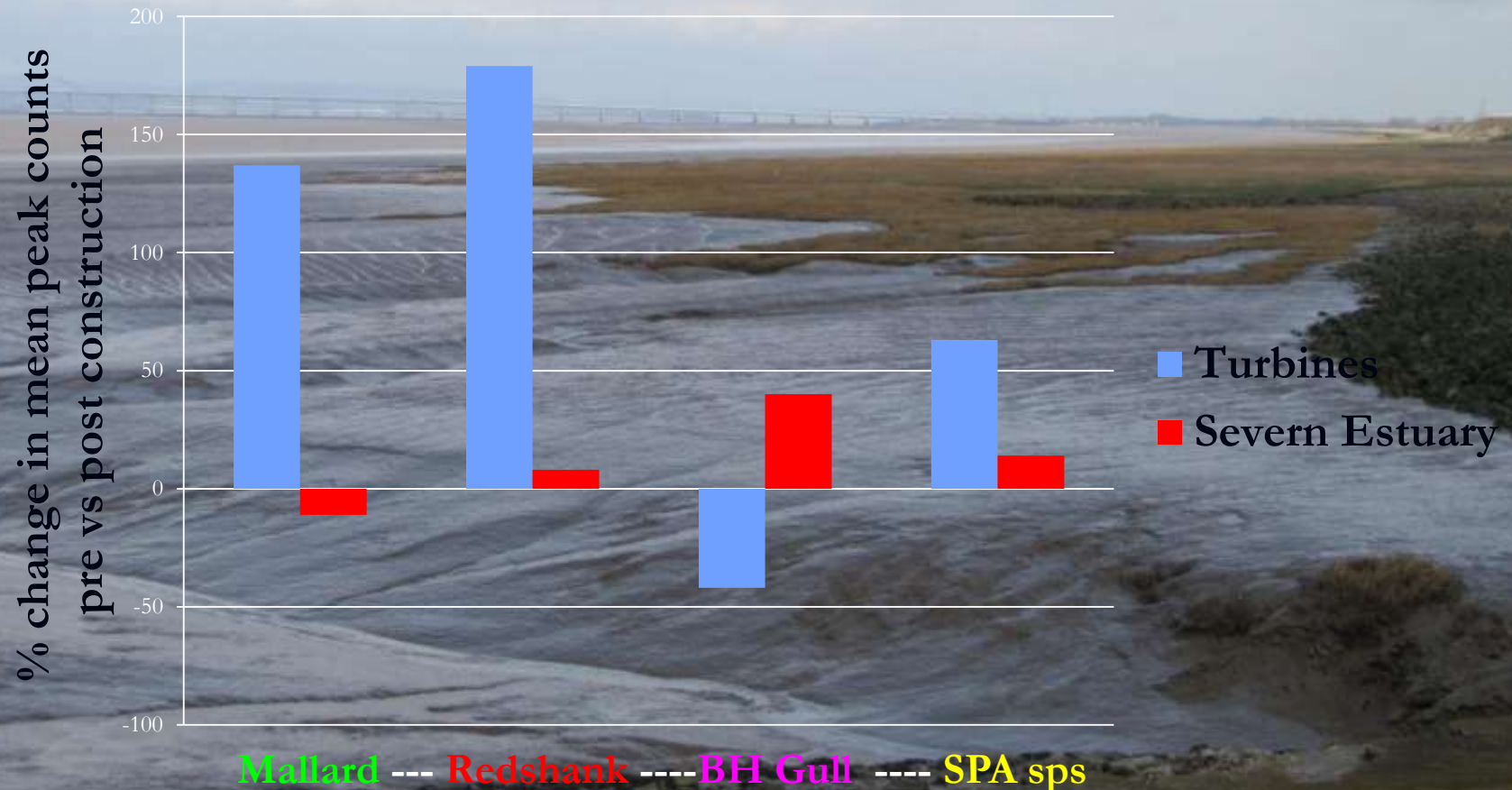
Comparison with Avon Area

% change in mean peak counts pre vs
post construction



Comparison with Severn Estuary

% change in mean peak counts pre vs post construction







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