Marine Spatial Planning: Using GIS to Drive Local Marine Policy

Dr Lorraine Gray, SSMEI Project Officer



Local Steering Group: Shetland Islands Council, Scottish Natural Heritage, Scottish Environment Protection Agency, Shetland Aquaculture, Seafood Shetland, Shetland Fishermen's Association, Shetland Shellfish Management Organisation, Royal Society of the Protection of Birds, BP, Shetland Amenity Trust, the Association of Shetland Community Councils, and the Fair Isle Marine Environment and Tourism Initiative. "Generally governance is more effective if it occurs where the problem is felt... and in cooperation with those affected by it"

(Jentoft and Chuenpagdee, 2009)



Scottish Marine Bill: Marine Planning Proposals

- The Scottish Marine Bill is expected to be enacted in April 2010
- Marine Scotland (the Scottish Government) will draft a national marine plan by 2012
- The local level will be delivered through Scottish Marine Regions (SMRs)
- Shetland Marine Spatial Plan would become statutory ordinance.



- Pilot started January 2006 (initially for 3 years)
- Covers seas around Shetland out to 12nm a major area for aquaculture, oil infrastructure, fishing and biodiversity
- 2731 km of coastline
- 10,580 km² of sea

Aims

- To produce & implement a Marine Spatial Plan via community participation
- To provide enhanced decision support to public bodies and others on the distribution and use of marine resources
- Improve the current planning regime



Marine Stewardship – An Excellent Track Record

Shetland Islands Council has controlled marine development for past 34 years – powers of the ZCC Act 1974

Shetland Shellfish Management Organisation – powers of the Regulatory Order



Marine-dependent economy – reflected in largest participation rate in beach clean-ups in the UK "Da Voar Redd Up"



Photos: Visit Shetland

Project Summary

2006 - 2007: Maps that underpin legislation and information used during the development control process

2007 - 2008: Policy creation & launch of Plan for Public Consultation

2008 - 2009: Re-draft, voluntary implementation

2009 - 2010: Strategic Environmental Assessment (SEA), Public Consultation & Implementation.

Shetland Marine Spatial Plan



Part One: Policy Framework - at this stage this is Shetland-wide

Part Two: Marine Atlas - with CD of data for use in Google Earth & GIS Marine Centre FOR THE SHETLAND ISLANDS

PART TWÖ: MARINE ATLAS

www.nafc.ac.uk

A MARINE SPATIAL PLAN

841

The Marine Atlas Data Challenges



The data had to be fit for purpose The extent of appropriate knowledge sources was vast

3. Transformation into a common spatial format was problematic

Distribution of activities Statutory constraints Advisory constraints



Activities:

Dredging & disposal

Commercial fishing

Aquaculture

Recreation & tourism

Access

Coastal archaeology



<u>Statutory</u> <u>Constraints:</u>

Main shipping routes

Protected ship wrecks

Pipelines & cables

Wastewater discharges

Sectoral policy areas

Fin fish farming Locational Guidelines

Designated nature conservation areas



Advisory constraints:

Otters & seals

Whales & dolphins

Seabirds

Sea ducks

Water habitats

Kelp Forest

'At Risk' waterbodies

Seabed habitats

Ship wrecks

Shore species & habitats



The extent of appropriate knowledge sources was vast



Data was collated from:
22 organisations;
15 scientific publications;
19 anecdotal sources.

Obtaining data from source was essential.





How do we transform a coordinate into a spatial area? How do you map mobile species? Are historical maps relevant? Is anecdotal evidence appropriate? Support from a local **Biodiversity Working Group was** essential

- Confidence level: 80% (this information is not used in the Plan)
- Current benefit: can target surveys more efficiently

annnnnnnn

Future benefit: identify sites in conflict / requiring management

Pecten (Scallop) favourable habitat Likelihood

•

2.5.

Very likely

Moderately likely

Unlikely



Policy Development Process

- Local Objectives: General principles of sustainability are interpreted into a marine context
- Local Policies: More specific objectives were established which reflect the international, national and local marine policy context (the relevant treaties, conventions, and plans)

Summary of Objectives

I. Integrate with other system 2. Establish policies 3. Improve knowledge 4. Safeguard marine life 5. Assess sensitivity of marine life 6. Identify priority areas for use 7. Identify and restore damaged habitats 8. Minimise conflict





Spatial Analysis Working Group was established and created two models for deriving other information from the data:

1. Weighted <u>all</u> mapped planning constraints to show 'acceptable areas' for certain developments (relates to objective 6: Identify priority areas for use

2. Developed an activity risk assessment matrix, which was embedded into a map to show 'cumulative pressures' (relates to objective 7: Identify and restore damaged habitats)



Offshore Wind Farm Red: SACs, SPAs, EPS, seabird breeding areas, wintering ducks and divers, major shipping routes, wrecks, archaeology below MHWS, native oyster Blue: biogenic reefs, Common seal breeding/haul out sites, grey seal breeding sites, otters, eelgrass beds, mudflats, sheltered muddy gravels, voes, lagoons. Yellow: nursery and spawning areas, predicted offshore reefs, other obstructions White: No data available

SCENARIO 1: DTARII IT "it did not reflect legal "noitection

"it did not consider land planning constraints"

"it did not consider physical constraints (the engineer's Indicative A Cable Wind Turbine Ar Low

Medium High

Very High

Area outside 50m depth contour

Cumulative Pressure Mapping Marine Biodiversity Risk Assessment Criteria

- A PROBABILITYknown effect on species,
population, and ecosystem1 5B INTENSITYfrequency of activity1 5
- C LONGEVITY expected time of impact post activityD PRESSURE spatial extent of activity
- E CONFIDENCE in base data

www.nafc.ac.uk

1 - 5

1 - 5

1 - 3

Example of scoring system:

EFFLUENT DISCHARGES - EQS 100m for each mixing zone, I.e. a buffer of 100m around the outfall was mapped.

Surface water from e.g. industrial estates	2	5	22	2	11	22	0.24
Sewage from e.g. septic tanks, emergency overflows, combined	2	5	1 1	2	0	18	0.20
sewer overnows	2	5		2	9	10	0.20
Organic trade effluent	2	5	1 1	2	9	18	0.20
Inorganic trade effluent major - Containing many toxic chemicals - WTE, de-icer, large quarries, landfill	2	5	52	2	14	28	0.31
Inorganic trade effluent minor - mostly suspended solids but also small amounts of toxic chemicals - backwash swimming pools,	0	5	2 2	2	10	24	0.27
smail quarties, on interceptors	2	5	52	2	12	24	0.27
Fish Hatcheries	2	5	1 1	2	9	18	0.20
station	2	5	32	2	12	24	0.27



~	1		~	~					. ,											
4	2		1	1	1	1	行3	3	3	3	3	4	4	3	3	3	3	3	3	
3			1	1	1	1	3	3	3	3	4	4	3	3	3	3	3	3	3	
		1	5-1	2	1	1	3,-	3	4	4	4	3	3	3	3	3	3	3	3	
		1	1	2		1	2	4	4	4	3	3	3	3	3		3	3	3	Ine result:
	2	2	 	2 -				р. Л			2	2	3	4	4	4	4	3	2	
	2	2	here	"	14		۶Ĩ,											5	K	coblom orogo"
	2	2			ll	3		a	y	3	3	N I		U	VV		1		8	Upieni aleas
2	2				2	2	4					1	1	1~	1	1	1	1	4	. Lots of numbered
ir 2					3	4	4	4						1	1	Q	Ν		3	
					3	4	3	4							1	V	Ļ	N, L	1	enligrae
						2	4	4	1						1	1	1	1,5	1	Squaigs
						2	4	4	4	3	1					1		1	1	roproporting the
								4	4	4	2				Į		-	1	1	representing the
				"	_		-	_												
							A	. 1	0	A								2	2	
				•••	N		Ś		ſÌ	ļ	Ì	1	n		h	1F	Ż	Ŝ	Ĉ	coring system"act
					N		Ś	TI	Ĺ	I\$	St	I	n		th)e	¢	S	Ĉ	coring system" act
				2	N	3	S 1	U	L 4	2 2	S 3 t	I	n			1e	3	S 3	3	coring system" act
				2	4	3 3	1		4 4	2 1		I	n		tr Ir		3	S 3		coring system"act trv ^{of an} area:
	1_	1		2	4	2 3 1 1	1	1	4 4 4	2		1	n		tr Ir			3 3 4	3 3 3 4	coring system"act try ^{of an} area:
	1	1	74	2 1 1 1 1	4 3 3 2	2 3 1 1 2	1 1 1	1 1 4 4	4 4 4				n		tr Ir) 3 4 4	3 3 4 4	3	coring system"act try ^{of an} area:
	1 2	1	1	2 1 1 1 1 1	4 3 3 2	2 3 1 1 2 2	1 1 1 1 3	1 1 4 4	4 4 4 1 3	2	S ₃ t		n		tr Ir	1 1 1 3	3 3 4 4 4	S 3 4 4 4	3 3 4 4 4	coring system"act try ^{of} an area:
	1 2 1	1 1 1	1	2 1 1 1 1 3	A 3 2 1	2 3 1 1 2 2 3	1 1 1 1 3	1 1 4 4 4	4 4 4 1 3				n		tr Ir	1C 1 1 3) 3 4 4 4	3 3 4 4 4 4	3 3 4 4 4 4	coring system"act try ^{of} an area: 1 = Negligible
	1 2 1	1 1 1	1	2 1 1 1 3 3	A 3 3 2 1 3 3 3	2 3 1 1 2 2 3 66	1 1 1 3 4	1 1 4 4 4 4	4 4 4 1 3 4			2	n		tr Ir	1 1 1 3	3 3 4 4 4 4 4	3 3 4 4 4 4	3 3 4 4 4 4	coring system"act try f an area: 1 = Negligible
	1	1 1 1 1 1 1	1	2 1 1 1 3 3	A 3 ,2 1 3 3	2 3 1 1 2 2 3 5 6	1 1 1 3 4 4	1 1 4 4 4 4	4 4 4 1 3 4	2 1 1 1 3 3 3 -)3C	n)				4 4 4	S 3 4 4 4 4 4	3 3 4 4 4 4 4	coring system"act try ^{of an area:} 1 = Negligible exfor public
	1	1 1 1 3	1 1 3 3	2 1 1 1 3 3 3 3	1 3 2 1 3 3 3 3	2 3 1 1 1 2 2 3 5 6 3	1 1 1 1 3 4 4 4	1 1 4 4 4 4 4 4	4 4 4 1 3 4	2 1 1 1 3 3 3 4			n Ŋ				4 4 4 4			coring system"act try" 1 = Negligible exfor public
2	1	1 1 1 3 3	ч 1 3 3 3	2 1 1 1 3 3 3 3 3	4 3 3 2 1 3 3 3 3	2 3 1 1 2 2 3 5 5 3 3 3	1 1 1 1 3 4 4 3 3	1 1 4 4 4 4 4 4 4	4 4 4 1 3 4 5	2 1 1 1 3 3 4 4										coring system" act try" an area: 1 = Negligible exfor public
2	1 2 1 3 3 3 3	1 1 1 3 3 3	1 1 3 3 3 3	2 1 1 1 3 3 3 3 3 3 3 3 3	A 3 2 1 3 3 3 3 3 3	2 3 1 1 2 2 3 5 6 3 3 3 3 3	1 1 1 1 3 4 4 3 3 3	1 1 4 4 4 4 4 4 4 4 4	4 4 4 1 3 4 4 4 4	2 1 1 1 3 3 4 4 4										coring system"act try" an area: 1 = Negligible exfor public ion" Alfedium
2	1 2 1 3 3 3 3 3 3	1 1 1 3 3 3 3 3	1 1 3 3 3 3 3	2 1 1 1 3 3 3 3 3 3 3 3 3 3 3	A 3 3 2 1 3 3 3 3 3 3 3 3	2 3 1 1 2 2 3 5 5 3 3 3 3 3 3 3 3 3	1 1 1 1 3 4 4 3 3 3 3			2 1 1 1 3 3 4 4 4 4										coring system" act try fan area: 1 = Negligible exfor public ion" Alledium
2 2 1	1 2 1 3 3 3 3 3 3 3 3	1 1 1 3 3 3 3 3 3 3	1 1 3 3 3 3 3 3 3 3 3	2 1 1 1 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	A 3 2 1 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 3 1 1 2 2 3 5 5 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	1 1 1 1 3 4 4 4 3 3 3 3 3 3	1 1 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	4 4 4 4 1 3 4 4 4 4 4 4 4	2 1 1 1 3 3 3 4 4 4 4 4 4 4 3			n)) 3) 3) 3 3) 3 3 3 3 3 3 3 3 3 3 3) 3 4 4 4 4 4 4 7 3 4 4 4 7 3 4 4 4 4 7 3 4 4 4 4 4 4 4 4			coring system" act try 1 = Negligible ex for public ion" Alledium 4 = High



The Less Prescriptive Option

Policy MSP NRGE

Exploratory, Appraisal or Prototype Renewable Energy Proposals

Exploratory, appraisal or prototype energy proposals will be encouraged where they have :

- a. complied with Policy MSP GD1 GD8;
- b. detailed any associated infrastructure required to service the site; and
- c. included an appropriate monitoring programme and detailed restoration proposals.

The granting of a Works Licence for exploratory, appraisal or prototype proposals will be for a specific time period and without prejudice to any subsequent application to develop fully operational projects at thet location.

- Same layout / wording as the land planning policies
- Similar in structure -9 general development policies followed by a specific policy to each sector



What does the current Shetland MSP do?

 Guidance to developers pre-application Information efficiencies to the regulators For non-licenced activities it provides guidance on conflict areas Benchmark to future research / management measures (fishery closed areas)

Current Status / Next Steps

- It is being used on a voluntary basis
- Retrospective Strategic Environmental
 Assessment is currently underway
- Second public consultation Nov 09
- Implementation as statutory ordinance presumably in 2010
- Extension to SSMEI funding in 2010?





Other Initiatives

- Survey programme / subsequent remodelling predictive habitat map
- Area-specific sub-area plans
- Sensitivity maps e.g. scallop dredging and oil spill contingency





Marine Spatial Planning is a process...
 ...that is painfully slow!

<u>Intelionskatelicates</u>

- Time / complexity of data transformation
- Steering Groups do not necessarily know what they want
- Public engagement and advice is crucial



What Worked Well

Community Engagement

 Fishermen and recreational users mapped areas important to them – filling gaps in data

Working groups played a vital role

- Trialling zoning & cumulative pressure mapping
- Getting the presentation of ecological data right
- Integrated policy making
- Habitat mapping keeps momentum
- Fish habitat areas and seabed biotope maps have many potential uses

Any Questions? Thanks for your attention!

Website: http://www.nafc.ac.uk/SSMEI.aspx