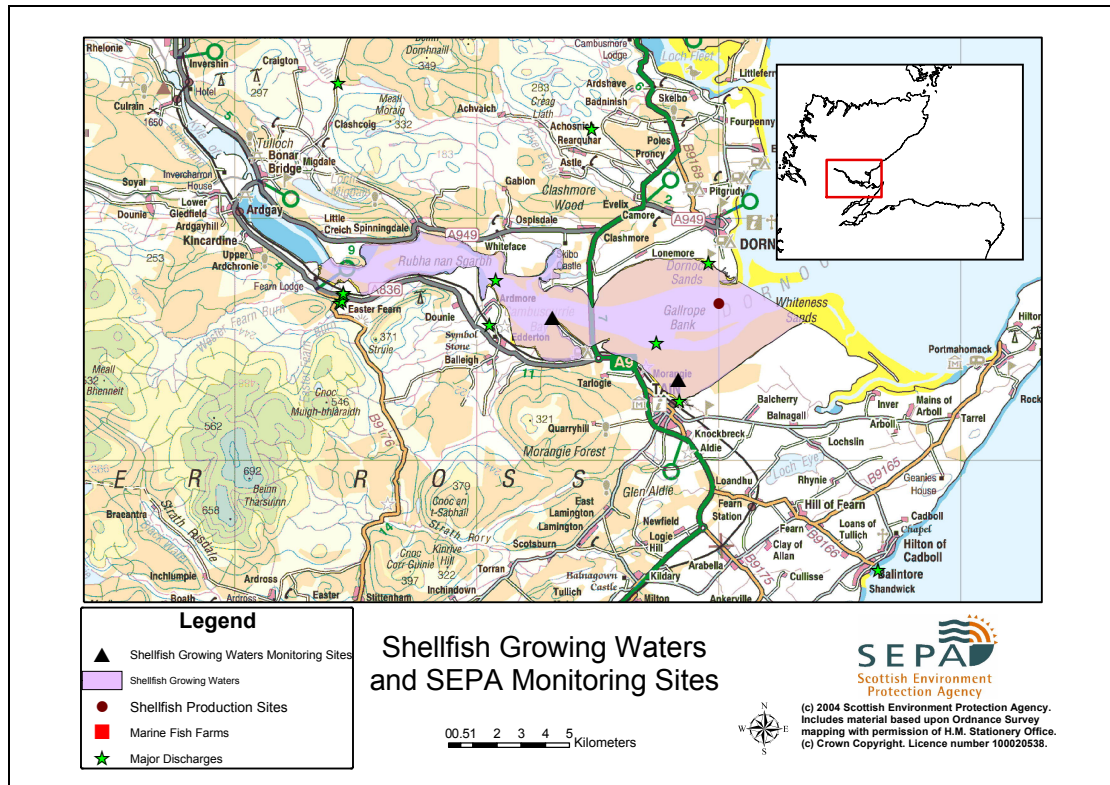


Area 1: Dornoch Firth



Report reference no.	1	
Name	Dornoch Firth	
Location Information	The area bounded by a line drawn between (NH) 263621 888131 (Wester Fearn Point) to (NH) 263977,888408, and a line drawn between (NH) 283669, 885717 (Rub na Innse Moire) and extending to MHWS. This designation supersedes existing SWD site at the Dornoch Firth.	
Designated area (km²)	51.77	
Year of designation	1981	
Sampling points	Dornoch Firth	NH 79994 83548
Commencement of monitoring	1981	

1.1 Commercial Shellfish Interests

No Crown Estates Commission (CEC) leases have been granted, although there are mussels in the area. The Food Standards Agency has given the area an A classification from February to December inclusive and B classification in January only. There are no designated shellfish harvesting areas in the waters.

1.2 Bathymetric Information

This shellfish water encompasses almost the entire area of the Dornoch Firth. The area is some 22 km long by a maximum of 5.5 km wide. The maximum charted depth (at LAT) is <10 m. Approximately half of the area is <0 m chart depth, ie intertidal area exposed at low tide. The slope from the min to max depth has a very shallow gradient (spread over 3 km, south to north). The substrate consists mainly of fine sand and mud material. The Firth is sheltered from prevailing winds but is very exposed from north and north-easterly winds, especially in the widest part of the Firth to the east of the road bridge, which produces a fetch that suspends a lot of fine material into the water column. There are no morphological pressures on the Firth.

1.3 Conservation Designations

Virtually the whole of the shellfish water is covered by the Dornoch Firth and Morrich More SAC designation. The Firth itself is an excellent example of a large and complex estuary, with a complete transition from freshwater to saltwater along its length. It is particularly noted for mudflats, sandflats, shifting and fixed sand dunes, and contains the most important acid dune system in Scotland. The Firth also provides habitat for approximately 2% of the UK's common seal population. See website below.

<http://www.jncc.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0019806>.

The eastern, seaward end of the shellfish water is the subject of the Dornoch Firth and Loch Fleet Ramsar and SPA designations. There are also three separate SSSI designations at Morrich More (mixed), <http://hti04.snh.gov.uk/sssidata/1188cit.htm> , Dornoch Firth (biological) <http://hti04.snh.gov.uk/sssidata/527cit.htm> and Kyle of Sutherland Marshes (biological) <http://hti04.snh.gov.uk/sssidata/885cit.htm>.

1.4 Topography and Land Use – Potential Diffuse Pollution Sources

The Dornoch Firth shellfish water, being over 20 km long, is bordered by a wide range of land uses. The most common of these are heather moorland and improved pasture, but there are significant areas of coniferous forestry, and small areas of arable land, semi-natural woodland and coastal wetlands.

Major roads run close to both the north and south shores of the Firth between Bonar Bridge and Tain, and the main A9 trunk road crosses the Firth by means of two causeways connected by a 1 km bridge.

There are numerous towns and villages along the shores of the Firth, the most significant being Bonar Bridge, Ardgay, Edderton, Tain and Dornoch.

Four rivers flow into the western, upper end of the Firth, these being the Shin, Cassley, Oykel, and Carron. In total, these rivers drain almost 1500 km² of moorland and mountain terrain that contains several hundred square kilometres of coniferous forestry. All of these rivers are monitored by SEPA at the point where they flow into the Firth, and all are consistently classified as being of at least good quality. There are numerous other minor freshwater inputs to the Firth. One of these, the Black Burn, receives treated effluent from Dornoch WWTP, but the impact of this discharge on the Firth is minimal.

1.5 Point Source Discharges

Type	Name	CAR authorisation	Treatment	NGR	PE	Additional information
Scottish Water Asset	Bonar Bridge WWTP CSO/ EO.	CAR/L/100384 3	Primary	NH 6074 9088	1840	
	Ardgay CSO/ EO					Pumps to Bonar Bridge
	Tain WWTP and CSO/EO	CAR/L/100167 2	Secondary	NH 7787 8282	5000	
	Dornoch WWTP and storm tank discharges	CAR/L/100871 7	Secondary	NH 7957 8821	4000	
	Edderton Septic Tank and CSO	WPC/N/58955 *	ST	NH 849 713	200	
Other	Spinningdale Septic Tank				50	
	Skibo Castle private WWTP	CAR/L/100200 6	Secondary	NH 733 886	130	
	Private household ST	Various around Firth			100	
Industrial	Name	CAR authorisation	Treatment	NGR	Additional information	
	Balblair distillery	CAR/L/1003976		NH 807 870		
	Glenmorangie distillery	CAR/L/1002032		NH 7730 8502		
	Wester Fearn Fish Farm	CAR/L/1001932	Primary	NH 6269 8812		
	Easter Fearn Fish Farm	CAR/L/1002170		NH 644 866		
	Easter Fearn Fish Farm	CAR/L/1002189		NH 645 869		

- There are no marine cage fish farms located within the designated water.

1.6 Compliance Monitoring Regime

Year	Monitoring Regime
2005 -	<ul style="list-style-type: none"> • Quarterly for Sal, DO, pH, temperature, visible oil • Twice yearly for metals in water • Annually for metals and organohalogens in mussels • Quarterly for faecal coliforms in mussels

This monitoring regime of the designated area was implemented in July 2005.

1.7 Compliance History

Year	Compliance history for Waters and Biota, excluding faecal coliforms data			Compliance history for faecal coliforms
	Overall Result	Imperative	Guideline	Guideline
1998	Pass	Pass	Pass	Not monitored

1999	Fail	Fail	Fail	Pass
2000	Pass	Pass	Pass	Pass
2001	Pass	Pass	Fail	Pass
2002	Pass	Pass	Pass	Pass
2003	Pass	Pass	Pass	Fail
2004	Pass	Pass	Pass	Fail
2005	Pass	Pass	Pass	Fail

In 1999, there was a failure to meet the Imperative standard for pH. This was due to one result out of six being slightly above the upper limit of 9. This single measurement was not consistent with other results for these waters. None of the discharges to the area have an alkaline component.

Faecal coliform (FC) levels in waters and shellfish flesh are influenced by rainfall; diffuse pollution from agriculture as well as by direct/indirect sewage discharges. The sampling site was changed in February 2004 to the mussel scalps at Tain, however, this was not a satisfactory site and was moved in 2005 to the Ferry Point pier. The failures during 2003-2005 are thought to be partially due to diffuse pollution from sewage treatment works around the Firth.

1.8 Future Monitoring Recommendations

The monitoring regime as described in section 6 will continue. In the event of any chemistry parameter failing to meet any EQS, the site will be revisited and re-sampled for the failed parameter. Samplers are asked to identify any evidence of visible harm to the shellfish population at the site.

1.9 Improvement Actions

The sewage from the villages and towns of Dornoch, Tain, Edderton and Bonar Bridge discharge to the Dornoch Firth. The Q&SII system had a project for each of these settlements to ensure the requirements of the shellfish waters Directive were met. Since the instigation of these projects, the boundaries of the designated shellfish water have been moved and now exclude Bonar Bridge and therefore, there will now be no change to the primary treatment afforded to the discharge. It is currently proposed to install some form of disinfection at Tain and Dornoch WWTW to reduce the bacterial load to the Firth from the works. Discussions are still taking place with Scottish Water regarding the required improvements to the discharge from Edderton which is currently served by a septic tank.

An improvement plan for the fish hatcheries on the Easter Fearn Burn has been undertaken with a drum filter being installed at the upper hatchery. This has greatly improved the state of the burn downstream from this hatchery, however, there are ongoing issues at the downstream hatchery. The discharge licences governing the effluent quality from the two distilleries have recently been reviewed to ensure compliance with UWWTD and that these effluents do not threaten EC Shellfish Waters environmental quality standards.

These improvements will help to ensure that the designated water continues to meet I standards, and progresses towards consistent compliance with guideline EQS values.

1.10 Summary of Actions

Action	Deadline
Q&SII investments at Tain, Dornoch, Bonar Bridge and Edderton	Ongoing
Improvement Plans for Easter Fearn Hatcheries	2005