University of St Andrews
St Andrews
FIFE KY16 9AJ

Scottish Institute of Maritime Studies

Orkney's Maritime Archaeology

Fieldwork Report and Results of Information Gathering

Draft - 28 August 1997

Introduction

Scapa Flow is one of the largest natural harbours in the world. Prehistoric remains testify to early colonisation and a sophisticated society made possible by water transport. The first settlers probably arrived on South Ronaldsay, the nearest landfall from the Scottish Mainland, in skin boats laden with livestock and seed. From there they spread to every island.

The Vikings called the Flow 'Skalpafloi'. Osmundwall at the southern tip was a Viking trading centre and harbour. In 1263, with Scotland challenging Norwegian rule, King Hakon brought his great Viking Fleet of some 120 large ships to anchor off St Margaret's Hope in a bid to maintain Norwegian influence.

From the fourteenth century onwards Orkney was a port of call for Hanseatic merchants trading principally in grain and fish. Settlement sites around the Flow have recorded histories which date back to Medieval times. Around 1590 an inn was built on the east shore of Hamnavoe (below the new Stromness academy) catering for visiting ships. In 1620 the Bishop of Orkney issued feus on the west side of the harbour on what is now the town of Stromness. In the 17th century landowners in Cairston and Hoy appear as ship owners.

It was on wars and shipping that much of Orkneys future prosperity would be built. Between 1688 and 1815 the wars in which Britain was involved made the English Channel an unsafe place for shipping and the route around the North of Scotland was preferred despite navigation hazards and the danger of attacks by privateers. In 1725 John Gow, the pirate, returned to his native Stromness before his capture on the Calf of Eday. In law the Earl of Orkney had rights of salvage over any ship, but in reality local people would smuggle away whatever they could. The problem became so serious in the sixteenth century that the Earl forbade islanders to attend wrecking incidents.

During the Napoleonic Wars, Scapa Flow was an important convoy assembly point for British vessels trading with Baltic. Another important source of employment for the islanders was the 'NorWast', the Hudson Bay Company and Whaling. The company recruited from about 1702 and appointed David Geddes, a Stromness merchant as their local agent. In the later 18th century, Orcadians comprised three-quarters of the company's workforce in Canada, because the whalers from Dundee and Hull were looking for men skilled in the use of small boats such as the Orkney Yole.

In the 19th century trade continued to expand and exports included hides, feathers, stockings, herring and kelp. From 1888 onwards there were often over 400 fishing boats in from all over the north east of Scotland. In 1824 there were four boatyards in Stromness, the biggest laid out at Ness by John Stranger in 1836. At this yard, in 1856, the ship 'Royal Mail' was built. It made the first regular crossings of the Pentland Firth, a service carried on by successive 'St Olas'.

In the early years of the 20th century and Britain acknowledged the threat of the German High Seas Fleet, a northern base was sought for the British Fleet. Scapa Flow's most famous episode came, when at 10.am on 21st June 1919 Rear Admiral von Reuter ordered the scuttling of the interned German High Seas Fleet. The subsequent salvage operations add another fascinating dimension to the history of the Flow.

During World War II, the coastal edge of Scapa acquired additional fortifications and accommodation for over 12,000 personnel. The war also gave the Flow its most tragic monument - HMS ROYAL OAK sunk by German torpedo in under 13 minutes with the loss of 833 men.

These are just a few highlights of Orkney's rich maritime past.

Field work Visit 15th-19th March 1997

During my four days, I visited all of the key sites which will be mentioned in this report. No diving was undertaken, rather a characterisation of the area and a testing of people's receptiveness to proposals to schedule some of the wrecks.

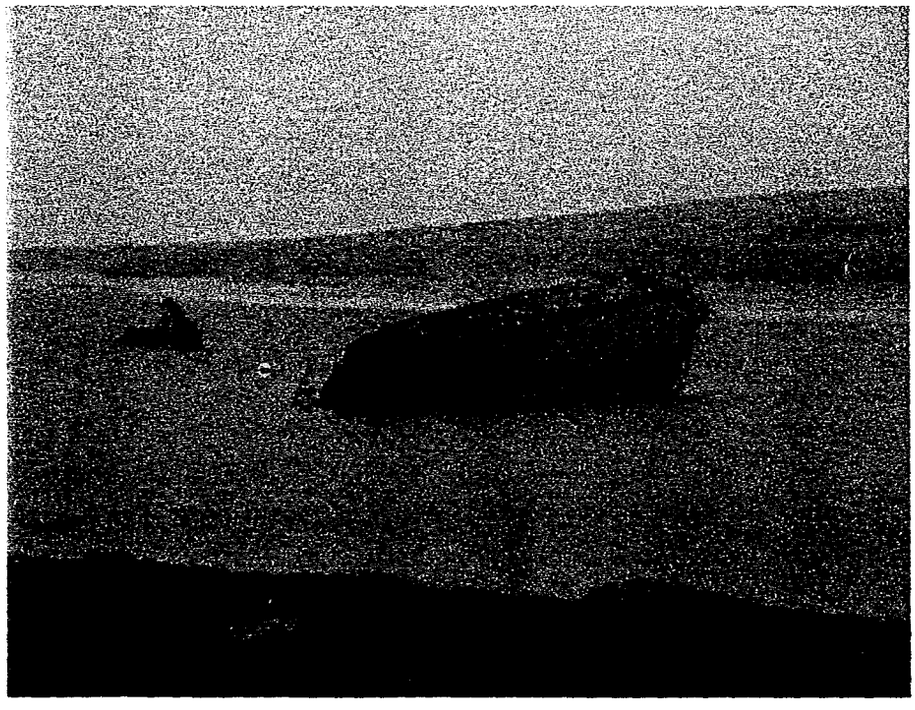
Saturday 15th March:

After my late afternoon arrival, I visited the bookshops in Kirkwall for relevant local publications for the NMRS library.

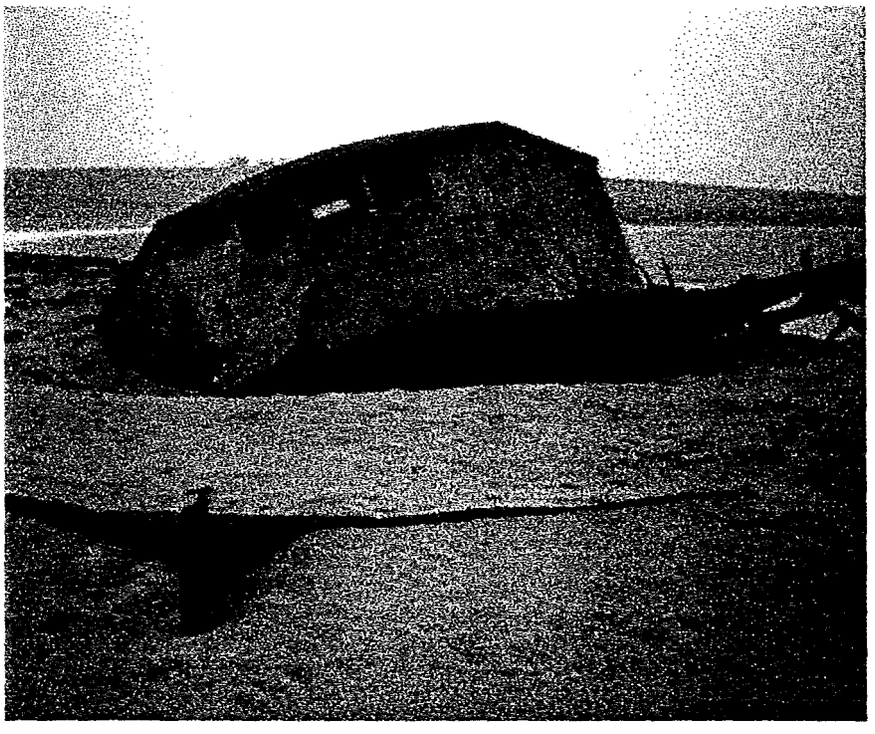
Sunday 16th March

I drove the coast roads stopping to explore any intertidal features which I spotted. My route began in the north heading for the Bay of Skaill then onto Birsay, Tingwall, Bay of Firth, Kirkwall, Churchill Barriers, St Mary's Hope, Burray, and the Pentland Firth Ferry terminal.

Very little was observed apart small stone built jetties associated with dwellings. The blockships at the Churchill barriers are the most obvious features intertidal features.

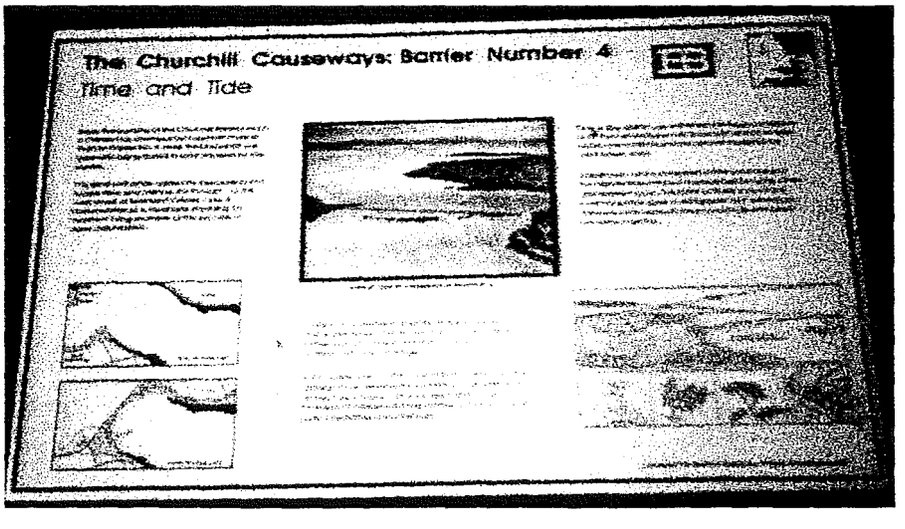


The stern of the iron 3 masted schooner REGINALD at Churchill Barrier No 3



Blockship CARRAN, believed to be reasonably intact, now incorporated into the sand build-up behind Churchill Barrier No 3. Photographs taken in the early 1990s indicate a recent a collapse of metal bridge structure supporting the concrete bridgehouse and a build up of 1m plus of sand.

Interpretation boards at the barriers tell the story of the building of the barriers, the flora and fauna of the sand dunes, but make no mention of the blockships. Even though, they are archaeological feature which visitors can walk right up to, climb over, etc. Noticeably cars in the laybys at the ends of the barriers park to look out over the water at the blockships, but there is not interpretation to explain what they are looking at.



An example of one of the Churchill Barriers display boards

At Burray, there is a boatyard with various decaying hulks, including an Admiralty Picket Boat (fleet tender/personnel carrier) of World War II vintage (length 70' or 21m) approximately) and small ship's lifeboat - perhaps removed from one of the blockships.

St Margaret's Hope a small coaster was observed in the process of being dismantled for its sheet metal.

Small coaster 'Crop' of Cowes near the settlement of St Margaret's Hope, length 100' approx.

Monday 17th March:

Captain Slater, Scapa Flow Harbour Master

Captain Slater kindly explained the dive permit system and provided statistics for the current numbers of sports diver activity in the Flow. He suggested that permit figures may not reflect the true picture as groups may not always apply.

The wrecks which represent particular hazards are the tanker PRUDENTIA and HMS ROYAL OAK with the cargoes of fuel oil. Diving is discouraged through liaison with boat operators and through publicity in dive guides. The Harbour Authority's radar system monitors the harbour area, and picks up dive boats in the vicinity of both wrecks. It has been known for vessels to be called up on the radio or warned away by the Harbour Authority vessels.

On the day of my visit, a Naval Diving Barge was on station near the ROYAL OAK. Navy divers were assessing the current condition and patching up thin plating where leakage had increased in previous few months. The location of the wreck is often marked by a small slick on the water surface.

The PRUDENTIA is not regularly visited to inspect its condition, and the Harbour Master expressed growing concern about the vessel's condition.

He did not know of any remote sensing surveys which may have been carried out. The Harbour Authority had not carried out any themselves to his knowledge. Occidental Petroleum (Caledonia) Ltd had surveyed around the Flotta terminal and its anchorages in the 1970s, and they regularly fly an ROV along their pipeline to inspect its condition.

A phone call to the Hydrographic Office in Taunton and the Wrecks Officer confirmed that the last Naval survey work had been done in the late 1980s. No more large scale surveys were planned as the Flow no longer has strategic importance.

For areas where tankers are likely to be anchoring and manoeuvring, there is a no diving exclusion zone marked on charts and this area covers wartime wrecks such as HMS VANGUARD.

The dive permit system only gives divers permission to dive on the KOLN, DRESDEN and BRUMMER, owned by Orkney Islands Council. The permit states that permission to dive the other wrecks (e.g. KARLRUHE, KRONPRINZ, etc.) must be obtained from the owner. Captain Slater suggested that trying to track down the registered owner (Clark Diving Services of Lerwick) had proved extremely difficult in the past. Correspondence had not been answered.

Clause 4 of the permit states that fittings from the KOLN, DRESDEN and BRUMMER which the Ministry of Defence regards as confidential, and any cash, notes, books or personal effects remain in the control of the Ministry of Defence. These items are not to be removed from the seabed, but notification is to be sent to the Ministry of Defence.

Under paragraph 33 of the Orkney Islands Council General Bylaws no diving is permitted with 30m of Lyness pier or within 100 metres of any Her Majesty's Ships, including the wrecks. Logically, one would expect that the loses of HMS ROEDEAN, the HM tugs OCEANA and STATHGARRY, and the Admiralty Trawler's IMBAT, STATHGARRY, DEWEY EVE, TOKEN, CATHERINE, RUBY and LEGEND would be covered under this Bylaw. However scant mention of this is made in the dive permit literature and the popular diving guides. This suggests that perhaps the procedure for applying for permission is either not generally known about or deliberately not followed. The bylaws direct requests for permission to dive HM Ships to the Queen's Harbour Master at Rosyth.

During a telephone conversation, the Queen's Harbour Master suggested that it was outside his normal area of operation and I was quickly directed to the Secretary of the Naval Historical Branch in Whitehall, who directed me onto Marion McQuaid, Sec (NS) in Whitehall. Conversations with her indicated that even the blockships would come under MoD authority and permission would be required to dive on the sites. She suggested that some wrecks we would not even be able to touch the superstructure, particularly if they were war graves. Each wreck proposed for survey/diving would be judged individually on the hazards it might present (e.g. unexploded ordnance, etc.) before permission would be given. The Ministry of Defence would be supportive of a properly led initiative to involve sports divers, and it would fit well with the message that they are trying to put across of 'looking but not touching'. When asked if divers contacted them for permission to dive, she said that 'the more responsible clubs certainly do'.

A breakdown of diving activity recorded by the Orkney Harbour Authority permit system is shown in figure 1. The area of seabed controlled by the Authority is shown in figure 2.

I suggested to Captain Slater the possibility of developing long term recording project. He was receptive to the idea and was particularly interested in the application of the information in their everyday operations for safer navigation, pollution control and un-fouled anchorage area.

Bobby Forbes - Institute of Island Technology, Herriot Watt University

Students enrolling on Herriot Watt's MSc/Diploma courses in Marine Resource Management and Marine Resource Development and Protection have the option of studying in Orkney or Edinburgh. The teaching activity in Orkney is based at the Old Academy Stromness, co-ordinated by staff in the International Centre for Island Technology (ICIT). ICIT is part of the Department of Civil and Offshore Engineering and was established to carry out advanced research, post-graduate training and consultancy in marine resource management and related issues such as sustainable

Figure 1

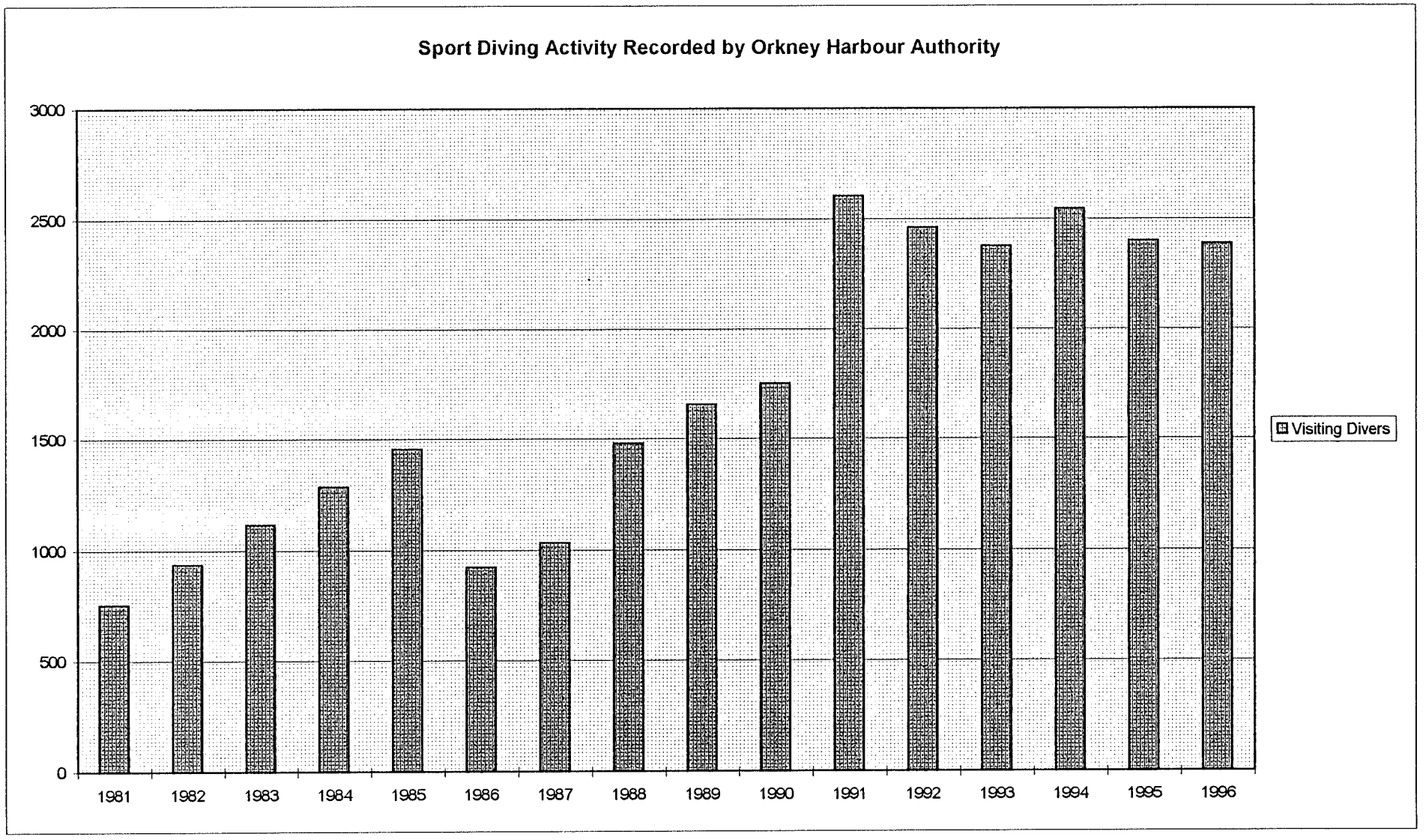
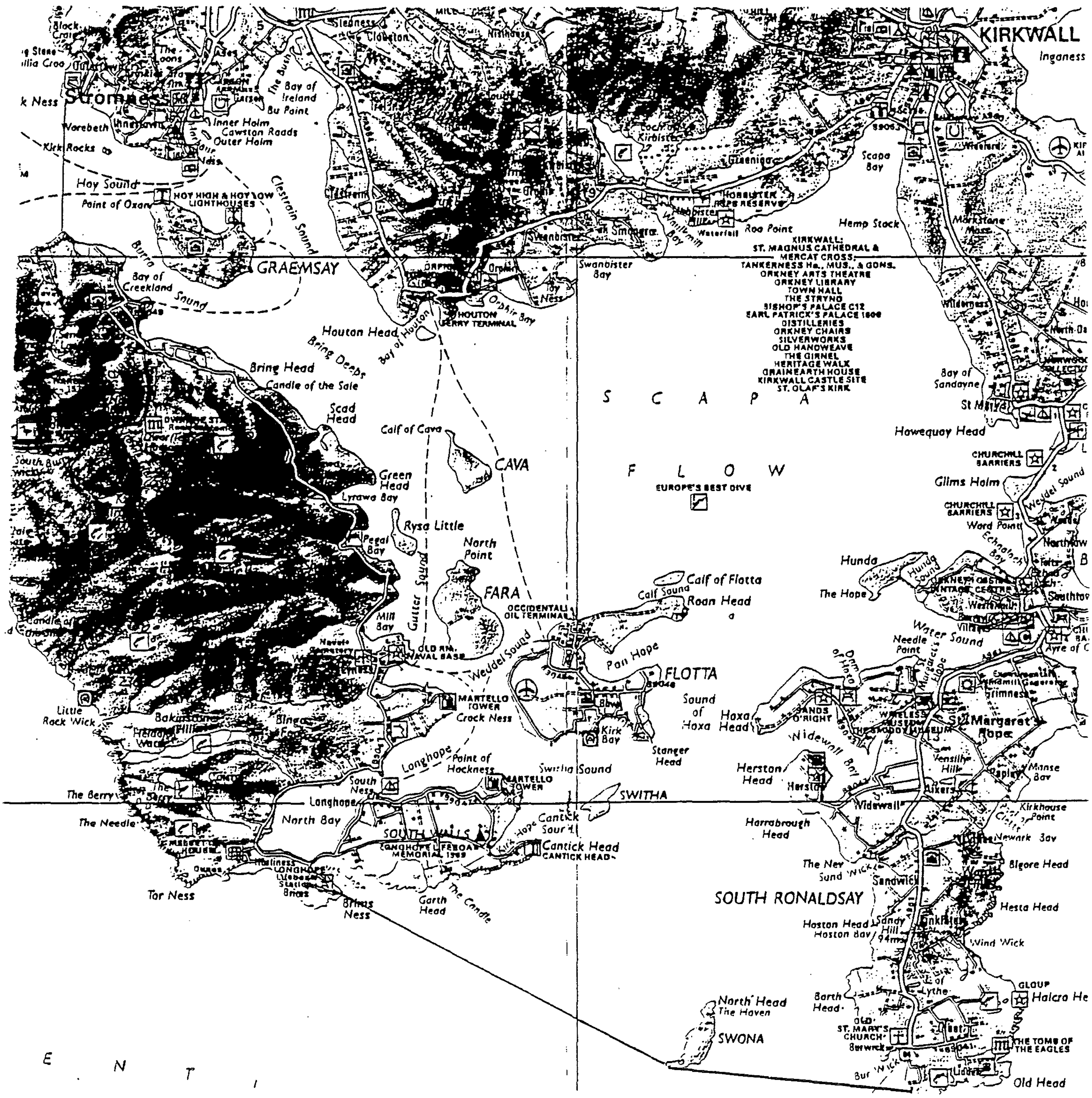

Sport Diving Activity Recorded by Orkney Harbour Authority
3000
2500
2000
1500
1000
500
0
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
Visiting Divers

Figure 2


KIRKWALL
Ingoness
Stromness
Hoy Sound
Point of Oxan
HOY HIGH & HOY LOW LIGHTHOUSES
Inner Holm
Cawston Roads
Outer Holm
Bay of Ireland
Bu Point
Clestrain Sound
GRAEMSAY
Burra Sound
Bay of Creekland
Houton Head
Bay of Houton
HOUTON FERRY TERMINAL
Orphir Bay
Bring Deeps
Bring Head
Candle of the Sale
Scad Head
Scapa Bay
Hemp Stock
Roo Point
Swanbister Bay
KIRKWALL:
ST. MAGNUS CATHEDRAL &
MERCAT CROSS;
TANKERNESS Ho., MUS., & GDNS.
ORKNEY ARTS THEATRE
ORKNEY LIBRARY
TOWN HALL
THE STRYND
BISHOP'S PALACE C12
EARL PATRICK'S PALACE 1600
DISTILLERIES
ORKNEY CHAIRS
SILVERWORKS
OLD HANDWEAVE
THE GIRNEL
HERITAGE WALK
GRAINEARTH HOUSE
KIRKWALL CASTLE SITE
ST. OLAF'S KIRK
S C A P A
F L O W
EUROPE'S BEST DIVE
Calf of Cava
CAVA
Green Head
Lyrawa Bay
Rysa Little
North Point
FARA
Gutter Sound
Pegal Bay
Mill Bay
OLD RN. NAVAL BASE
Bay of Sandayne
Howequoy Head
CHURCHILL BARRIERS
Glims Holm
Weddel Sound
Ward Point
Hunda
Hunda Sound
The Hope
Calf of Flotta
Calf Sound
Roan Head
OCCIDENTAL OIL TERMINAL
Pan Hope
FLOTTA
Sound of Hoxa
Hoxa Head
Kirk Bay
Stanger Head
Water Sound
Needle Point
St Margaret's Hope
Widewall Bay
Herston Head
MARTELLO TOWER
Crock Ness
Longhope
Point of Hockness
Swithia Sound
SWITHA
Little Rack Wick
The Berry
The Needle
North Bay
South Ness
SOUTH WALLS
LONGHOPE LIFEBOAT MEMORIAL 1969
Cantick Head
CANTICK HEAD
Tor Ness
Garth Head
The Candle
Brims Ness
Harrabrough Head
The Ney Sound
Sandwick
SOUTH RONALDSAY
Hoston Head
Hoston Bay
Manse Bay
Kirkhouse Point
Newark Bay
Bigore Head
Hesta Head
Wind Wick
GLOUP
Halcro Head
North Head
The Haven
SWONA
Barth Head
OLD ST. MARY'S CHURCH
THE TOMB OF THE EAGLES
Old Head
E N T

development, coastal zone management, environmental economics, fisheries and marine biodiversity . The Old Academy also provides the base for the Diving Unit which offers professional (HSE Part VI) and leisure (PADI) air diving courses.

Because of its 'remote' location (nearest re-compression unit is Aberdeen approximately 2 hours away), the Diving Unit has its own twin-lock re-compression chamber, although it is not manned full time like Aberdeen or Dunstaffnage. The unit's equipment list includes 12 complete sets of SCUBA, 4 compressors, 2 zodiac rubber inflatable boats and outboards, 4 underwater camera systems, and 3 underwater video systems.

Bobby Forbes is currently University Diving Officer and is a qualified diver medic, assistant life support technician. He is a member of Marine Biological Association of the UK and Nautical Archaeological Society and serves on numerous committees including scientific Diving Supervisory Committee and the HSE Diver Competencies Steering Group.

Discussion with Bobby Forbes covered a variety of subjects. He was able to give valuable insights into the diving community in Orkney. In particular he mentioned the 'in-fighting' between various dive boat operators. For example, a new company had decided to become based in the area and as a consequence, existing operators temporarily removed all the buoys marking the wrecks.

Bobby Forbes was the author, in June 1990, of a major review of environmental issues for Scapa Flow in which he gathered statistical information about various activities which impact on underwater archaeology

Mariculture - 35 licences had been issued in 1990 by the Harbour Authority and Crown Estate Commissioners, accounting for about 60% of Orkney's marine farming licences. The pattern of licences reflected the steady increase in the number of salmon farms. The choice of locations is limited due to the lack of deep water. A questionnaire sent out to farms discovered that most farmers did not have an environmental monitoring programme, however a few inspected the seabed through divers and at least 2 annually sampled the seabed beneath the farm. Possible impacts on underwater archaeology include changes in seabed chemistry and biology, damage from boat anchors and methods of anchoring cages.

Commercial Fishing - the majority of fishing takes place outside the flow. The only catch of commercial value is shellfish species such as lobsters, crabs and scallops. Bobby Forbes reported that since the building of the Churchill Barriers that scouring and flow of sand into the Flow had changed. Scallop divers are reporting the spread of silt over formerly productive sandy seabeds. Possible impacts on archaeology through commercial fishing activities include the siting of lobsters pots close to wrecks, and the retrieval of objects by scallop divers, and the use of scallop dredges.

Oil Terminal Operations - Tankers approach Scapa Flow either east or west of Swona depending on their port of origin. They have five destinations - the jetty, the two single mooring points (SPMs) and three anchorage areas. In 1987, 70% of the tankers anchored in the anchorage areas prior to moving to other areas. It is unlikely that any upstanding wreckage remains, however large anchors can dig deep and cause enormous damage archaeological remains when dragged.

Industrial Discharges - the 1990 report indicates that in addition to the salmon farms whose effluents have been designated industrial, there are three other industrial outfalls - two distilleries, a creamery and the oil terminal. These cause local acute rather than chronic pollution problems. In addition to operational discharges, oil loading in an enclosed area like the Flow poses a risk of environmental damage. Since the terminal opened there had been 30 incidents of oil pollution involving 240 barrels of oil.

Sport Diving - the overwhelming attraction is the wrecks of the scuttled German World War I Fleet which includes three battleships and four cruisers all scattered around the Island of Cava. The normal pattern is two dives per day, one of which is relatively deep, building to the deepest dives at the end of the week. The most popular months are July, August and September. In 1981, four operators were engaged in operating diving boats. In 1989, there were abut 7 full-time and five part-time operators. Most operating out of Stromness. The income to Orkney was in the region of £630-700K in 1989. The combination of deep diving and corroding wrecks makes Scapa Flow a potentially dangerous location to dive. In Bobby Forbes' experience, the rate of collapse the wrecks is increasing . The INVERLANE, one of blockships of Hoy Sound, has changed markedly over the preceding winter. The incidence of bends per dive was twice the national average. In general, there is at least one diving fatality per year. Contact with Maureen Sinclair at Stromness Medical Practice revealed that there was no up-to-date statistical information, but in her view the number of incidents had not changed markedly in the last seven years, despite the increase in the number of divers (there have been 2 deaths in Scapa Flow this year already). Although many incidents may not get reported if the symptoms are slight.

In the recommendations of Bobby Forbes' report he suggested that the diving industry in Scapa Flow was presently directed towards a specified group of advanced divers with an interest in wrecks, and there existed world-wide a great potential to expand the market. There was also thought to be a need for improved shore support infrastructure including such facilities such as showers and changing rooms, equipment support, sales and rental incorporated into a diver centre within Stromness and close to the harbour.

Other tourism initiatives included the placing of small lay-bys for cars to pull off the road at strategic view points and walks around the entire perimeter to encourage people to explore first hand the natural history and archaeology around the Flow.

ICIT would be very interested in participating in survey work - as a contractor. In another capacity they might also be able to contribute facilities such as classrooms, cylinder charging facilities, equipment and medic support to a summer school initiative.

Sailing and Marina Development - Sailing in Scapa Flow is enjoyed by local boat owners and their interest has been steadily increasing. There are sailing clubs at Stromness, Longhope, Burray and Holm. Recent marina developments are an attempt to attract yachts passing on their way to Shetland or further north.

Stromness Museum

A visit was made to the museum to review the collection for maritime material. Displays included objects from the German wrecks, such as navigation lights, machinery makers plates, and personal effects such as binoculars (the condition and stability of the objects after immersion in seawater may give be giving cause for concern). Other obvious shipwreck material related to the DUKE OF SUSSEX, SVECIA, KATHLEEN ANNE, JANET and HERALD. There is obviously a task in relating these artefacts as external collection records within the NMRS.

Other displays on maritime themes included the most recent exhibit on Dr. John Rae who charted much of the Canadian coats for the Hudson Bay Company. Other told the story of Orkney's herring fishing industry and the ferry service to the mainland.

Tuesday 18th March:

I attempted to see Raymond Lamb in the morning with no success, although I did speak to him on the telephone and he confirmed that there was very minimal information on shipwrecks in the SMR. He was supportive of the idea to include information and believed that scheduling of the more significant wrecks would be an excellent move.

A trip to Kirkwall Museum revealed a up-to-date displays of the prehistory of Orkney, but little that was obviously maritime related.

A meeting with Richard Welsh, Planning Officer, was scheduled for late afternoon and he was able to supply a number of key documents such as the *Orkney Islands Structure Plan 1993*, *Scapa Flow Local Plan 1975* and the *Scapa Flow Management Strategy Report* by the Institute of Island Technology.

The Structure Plan is supportive of initiatives to redistribute economic activity more evenly throughout the archipelago. It is believed that tourists can be encouraged to spend more time in the outer isles, thus distributing the economic benefit of tourism to outlying areas and relieving the pressure on the fabric of the much-frequented ancient monuments on the Mainland. Publicity and package deals, greater accessibility, better quality facilities and improved visitor management of sites of interest.

The Council's specific objectives include;

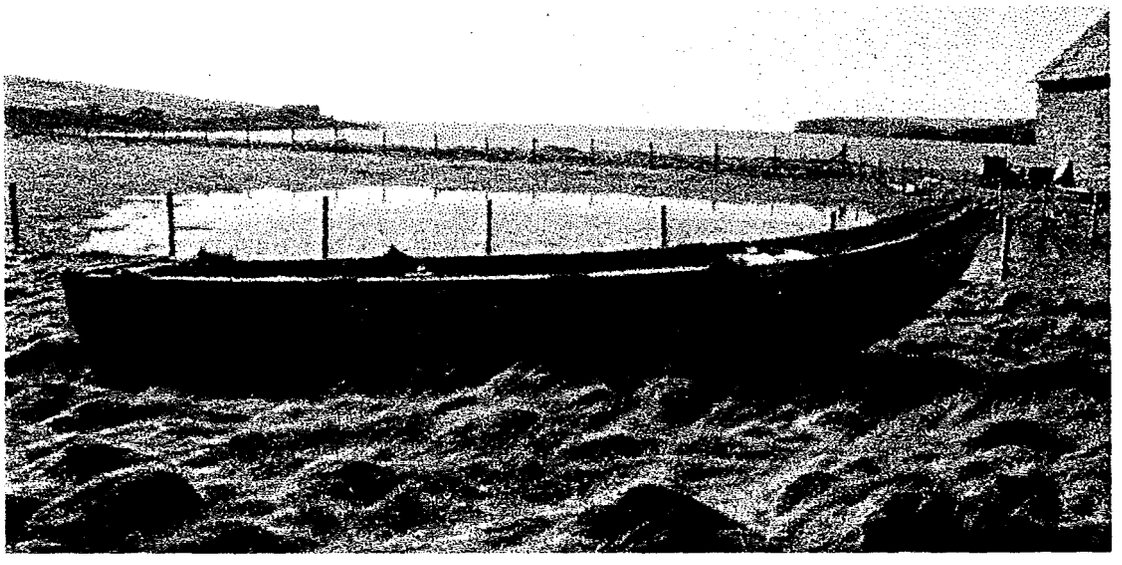
> *to maximise the potential of the unique landscape, seascape, wildlife and cultural heritage of the Plan are through attention to access and interpretation*

Richard Welsh suggested that the Planning Department would have no particular problem with dealing with scheduled wreck sites. He thought that it would be helpful in raising awareness and that it might also discourage the more 'unruly' or 'macho' members of the sport diving community who sometimes caused trouble with the local people.

Wednesday 19th March:

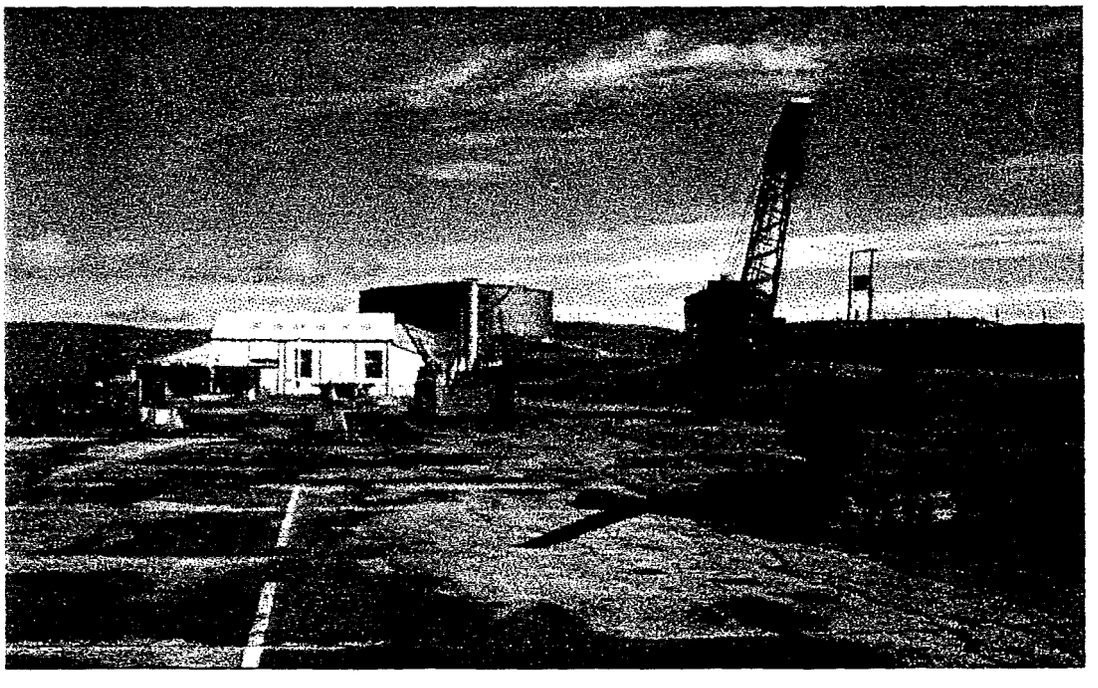
Catching the first ferry across to Hoy, we were overtaken by Occidental's fast staff transport craft. Also on passage, a number of small buoys were spotted. To the initiated, these mark the positions of the sunken fleet and are maintained by the Dive Boat Operators to help locate sites and provide a shot line which will guide divers to the wreck. Their method of anchorage to the seabed or wreck is unknown, as is the possible damage to the site.

Waiting for the Lyness Museum to open I explored the naval cemetery and drove onto the blockships of Hoy Sound. The road ends at a farm near a churchyard. Parking for the church allows cars to be pulled off the road. There was no interpretative material to explain the blockships clearly visible from the view point. I returned towards Lyness and drove onwards along the coast road to Longhope RNLI station looking for intertidal remains. Evidence of small scale fishing was found in buildings, improved slipways and an abandoned salmon cobble.



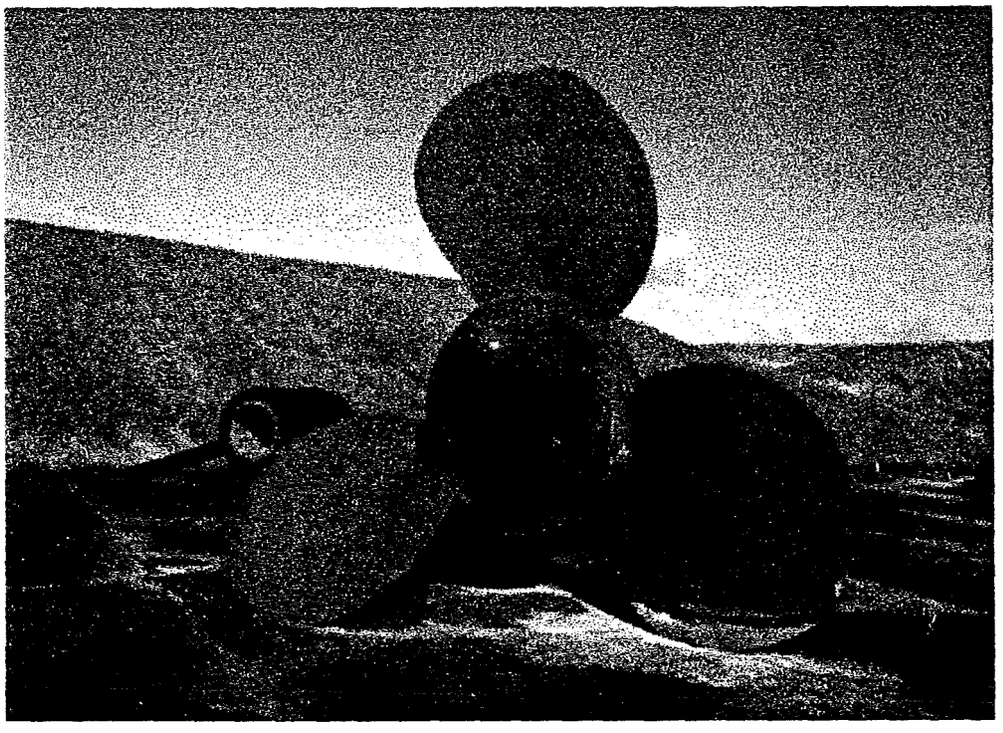
Wick registered salmon cobble, seemingly abandoned at the junction of the B9041 and the unclassified road to Longhope Lifeboat Station.

The Scapa Flow Visitor Centre, Lyness, is housed within the former oil pumping station of the Lyness Naval Base which was closed in 1956. The base was bought by Orkney Islands Council in 1977 who cleared the concrete remains and one of the oil storage tanks as part of a land rehabilitation programme during 1984.



The car park area of the Scapa Flow Heritage Centre with an assortment of guns raised from the shipwrecks, boom netting and other objects concerned with the seaborne defence.

The Pumphouse was refurbished and opened in April 1990 as a museum. The former Lyness military complex is vast with the buildings open to the public representing only a tiny proportion of what once stood on the site. The museum currently receives approximately 5,000 visitors per year.



The enormous bronze propeller of HMS HAMPSHIRE

Displays include material confiscated after the illegal salvage of HMS HAMPSHIRE and other items declared to the Receiver of Wreck and donated to the museum by divers. These simply stand on the floor and it seems doubtful that any scientific conservation treatment has been applied. Artefacts include binnacles, brass shell cases, an aircraft propeller and engine, small propellers, guns and their mounts.

Two compass binnacles recovered by Sports Divers and donated to the museum under encouragement by the Receiver of Wreck

Interpretative wall displays tell the story of the sinking of the ROYAL OAK. It is noticeable that this is the only wreck where the panels feature 'first hand' images, i.e. underwater photographs taken by the Navy and by sports divers given a special license to record the site in 1979. Illustrative material relating to other wrecks is restricted to

artist's impressions. However, there is a useful model showing the wartime boom defences. The original source material and the model itself prove helpful in the identification of underwater anomalies as lost or jettisoned booms.

Whilst I was waiting for the ferry to return, a dive boat docked at the quay and disembarked its divers for a trip around the museum during their decompression interval. This is a regular occurrence, and brought the number of visitors for the morning up to around 20.

At the beginning of my visit the staff behind the desk were obviously involved in routine maintenance, and not really expecting visitors. The float for the till was not made up, and it was a 'scrabble' to find change for my purchases. However later I did receive a personal guided tour of one of the huge fuel bunkers.

My lasting impression is of a museum waiting for a 'cash' injection to develop its exhibits and visitor facilities. Perhaps this is planned for the future. The mix of original building and machinery with 'extraneous' material I did not find 'easy'.

NAS Part 1 and survey of the Churchill Barrier No 2 blockships, Lycia and Ilsenstein - 24/25th July 1997

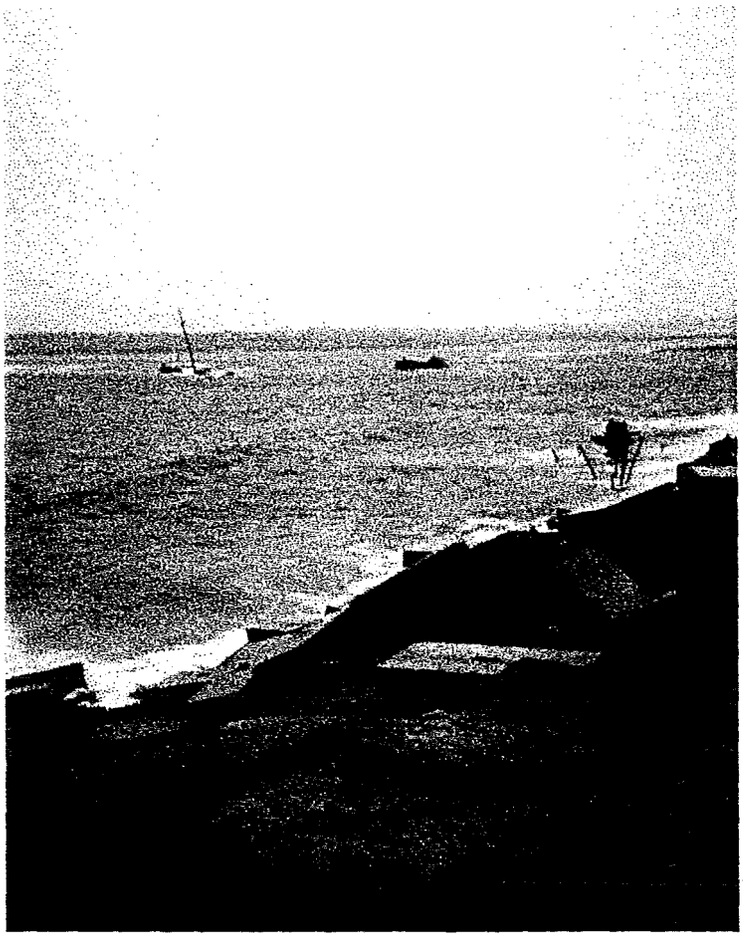
Through NAS Training Scotland, I was invited to take part in an NAS Part 1 for nine students at Herriot Watt University. The 24th July was the normal day of NAS lectures, but the next day was spent carrying out practical exercises on the two wreck sites.

A plane table exercise plotted the location of two buoys marking the boilers of the ILSENTEIN in relation to the Barrier. More detailed work was carried out recording features around the boilers to create a datum web for the DSM (Direct Survey Method) computer software. Offset exercises recorded the curvature and frame spacing of a surviving portion of hull structure, plus the extent of an in-situ decking. An overall sketch plan of the relationships between various parts of the wreck was produced to add further survey work and underwater photographs were taken by Annabel Wood.

The day was thought to have been highly successful, the data and copies of all recording forms will be sent to the RCAHMS in due course.

The sites are thought to offer many opportunities for sports diver involvement. Their sheltered location, shallowness (increases the bottom time) and ease of access (no boat required to reach the site) makes them particularly suitable. I have already spoken to Chris Underwood, NAS Training, about the possibility of a NAS summer field school for next year and he is broadly supportive. There are also surveying tasks for non-divers, such as the wrecks incorporated into the sand dunes, or within wadding/snorkelling distance at Barriers 3 and 4.

The lack of information about the wrecks is a hole in the noticeable gap in the interpretation strategy for the Barriers, and a summer field school would help to rectify this situation



The engine block of the LYCIA in the foreground stands approximately 4m proud of the seabed and can be seen at all states of the tide. The bows of the vessel and bottom plating are now incorporated into the Churchill barrier underneath the tumble of blocks. The remains of the ILSENSTEIN extend seaward from the LYCIA and are completely submerged.

Management Scenarios

There are various options which can be explored for Scapa Flow

Scenario 1: No intervention

It appears likely that Sports Diving in the Flow will continue to increase steadily at a rate of approximately 4.5% per year. The trend in sport diving is changing away from 'wrecking' to more technical diving (experimenting with gas mixes), but the audience is likely to remain the adventurous diver with the worst reputation for artefact removal. With no intervention, the audience for the sites excludes the vast majority of Orkney's other visitors. The underwater pressure will continue on the key wrecks of the German Fleet which are becoming increasingly fragile. On land, no diversification of visitor attractions continues the pressure on prehistoric sites such as Skara Brae and Maes Howe.

There are safety aspects to address with regard to diving, for example Bobby Forbes' recommendation of roped routes to help the divers navigate around the wreck (a feature of site management and safety in other countries), and the minimum 2 hour delay to get casualties to Aberdeen's hyperbaric facilities. Casualties will continue.

This option also represents a missed opportunity to carry out long term monitoring and research into the deterioration of steel wrecks and possibilities of in-situ conservation which other countries are beginning to seriously address.

Scenario 2: Community Stewardship

The principles in this kind of initiative will be the Association of Dive Boats Operators, who must be convinced that working with heritage bodies and archaeologists will protect and enhance their livelihoods. Encouragement and contact from Orkney Heritage Trust will perhaps help to educate and encourage the Dive Boat Operators to report their own finds, and through contact with sports divers, discourage ad hoc artefact removals. Other small scale initiatives might be to encourage the setting up of roped routes around chosen sites. Or Orkney Heritage Trust might offer a weekly talk during high season (June, July, August) to incoming sports divers on their archaeological importance of the underwater heritage of Scapa Flow - the right message at the beginning of their stay.

Scenario 3: Community Stewardship and Scheduling

Scheduling sites would change public perception of the wrecks as being simply bits of junk on the seabed and place them on a par with the defensive land sites already designated. It could also be used a vehicle to stress their fragility - they have now reached the point in the degeneration process which is critical.

Liaison with the Ministry of Defence who retain ownership or interests in the wrecks will be a key issue. Initial contact suggest they would not be adverse, although they might question the impact it might have on future income from salvage rights and from annual licences given to dive operators to visit the wrecks (MOD has charged commercial operators for permission to dive Naval wrecks in the past- Martin Dean, personal comment). A fee paid by all the operators could offset the cost of maintaining properly placed wreck markers. Orkney Islands Council own the KOLN, BRUMMER and DRESDEN and it would seem that these might be the first vessels with which to test the water, if you pardon the pun..

Scheduling would, one would hope, encourage more detailed recording, leading to the production of a 'heritage' rather than 'diver' guide and a long term monitoring programme - whether it is by using NAS volunteers, contracting a service agreement with Herriot Watt or a local Dive Boat Operator, or adding scheduled sites to the remit of the Archaeological Diving Unit (ADU) in Scotland.

Scenario 4: Development of Marine Preserve

I did not discover any evidence of a local forum for Scapa Flow, similar to the 'Estuary Forums'. The establishment of a voluntary marine preserve with codes of practices by users, etc. would undoubtedly benefit both the marine life and archaeology of the Flow. An ongoing scientific research programme co-funded by SNH into the impact of closing the eastern sounds could be extremely beneficial to the understanding of preservation conditions. The spins offs would be better interpretation and increased tourism potential and the better management of marine resources.

Scenario 5: Full development of Marine Park

Prime examples of these are found in Northern America. For example in the 1970s, Parcs Canada initiated a long term plan to develop a series of national marine parks. In 1987 the Canadian Government finalised an agreement with Ontario to obtain title to the Fathom Five Provincial Park and protect numerous 19th and 20th century shipwrecks (see Appendix 3 page 31). The park has become an important destination for divers with the local economy becoming dependant on 'cultural diving'. Visiting divers register before diving. Several dive boats operate including glass bottom boats for non-divers. Mooring buoys locate each of the sits for dives and are maintained by Park Rangers, who also

routinely check diving boats for violations and provide information and assistance, there is an interpretative centre and a hyperbaric chamber for decompression diving. On going monitoring and research is carried out by Parc Canada's small team of underwater archaeologists. Scapa Flow would be the ideal location to duplicate many of these elements.

An orientation centre at Stromness; water-borne, summer-time wardens visiting divers on site with perhaps the safety facility of a portable re-compression chamber on board; the development of the Herriot Watt facility into a all year round emergency medical centre with trained diver medics; development of local museums; ultimately perhaps to explore the possibility of sinking more vessels (e.g. the Australian navy has developed a policy in favour of the use of decommissioned vessels as man made reefs to encourage marine life). This later request has been raised already by the Diver Boat Operators.

The powers, by-laws and area defined by the Orkney Island Council Harbours Authority provides a starting point for strengthen the protection of the underwater cultural heritage.

Preliminary Thoughts on Sites for Scheduling

It might be claimed that it is early days yet to assess the significance of the wrecks of Scapa Flow in the light of ongoing NMRS Maritime Record Enhancement. On the other hand the significance of the wrecks is well documented and proven. Nowhere else in the UK is there such as concentration of early 20th century warships which represent the forefront of contemporary technology. Comparable areas world wide such as Truk Lagoon or Pearl harbour already have established management frameworks which recognise their heritage merit. One might consider a blanket scheduling of all the wrecks and wreckage within the limits of the Scapa Flow harbour area.

Alternatively, in line with the on-going Defence of Britain project, the obvious choices are the Churchill barriers, their associated blockships and those of Hoy Sound. The barriers are believed to be designated of 'regional importance' and the blockships should have the same level of significance.

Of the large warships, the ROYAL OAK is perhaps the most obvious choice. However, Historic Scotland would have to be prepared to deal with scenarios resulting from leakages of her fuel oil. HMS VANGUARD is a poor alternative- not in nearly such good condition having exploded in the first instance and then having been sporadically salvaged over the years despite being a war grave. Existing war grave designation should restrict diving activity on these sites. There are a variety of smaller naval vessels ranging from requisitioned trawlers to tugs and the minesweeper HMS ROEDEAN. The majority of which have been demolished by explosives, salvage work or natural processes. Assessments of condition from fieldwork, and vulnerability and public perception through liaison are needed to determine priorities amongst these.

Of the German warships, one might hope in time give them all special status, but while there may be plans for continued salvage resistance may be met from the current owners. I also wonder about lingering 'anti-German' public feeling and the thought of making the first 'scheduled' vessels in the Britain of German origin. If these are considered then scheduled area might extend to include the sites of the salvage vessels, such as the BAYERN whose gun turrets remain in situ.

Short Bibliography

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Allan, 1996 *Orkney's Maritime Heritage,* National Maritime Museum

Ridley, 1992 Dive Scotland Volume III - the Northern Isles and East Coast

MacDonald, 1989 *Dive Scapa Flow*

Ferguson, 1988 *The Naval Wrecks of Scapa Flow*

van der Tat, 1986 *The Grand Scuttle*

Bowman,1964 *The man who bought a navy*

Hewison 1985 *This great harbour Scapa Flow*

Appendix 1: Current Enhanced Record Site List for Scapa Flow

HY 20 NW 8000 HY 2320 0800 NMRS No 115960
CARMANIA II: KIRK ROCKS, HOY SOUND
20th Century
Steam Trawler

HY 20 NW 8692 HY 2447 0519 NMRS No 101682
RONDA: BURRA SOUND
20th Century
Steamship

HY 20 NW 8702 HY 2468 0514 NMRS No 102165
ROTHERFIELD: BURRA SOUND
20th Century
Steamship

HY 20 NW 8861 HY 2454 0513 NMRS No 102320
INVERLANE: BURRA SOUND
20th Century
Tanker

HY 20 NW 8862 HY 2439 0519 NMRS No 102321
URMSTONE GRANGE: BURRA SOUND
20th Century
Steamship

HY 20 NW 8863 HY 2459 0514 NMRS No 102322
BUDRIE: BURRA SOUND
20th Century
Steamship

HY 20 NW 8871 HY 2439 0513 NMRS No 102329
TABARKA: BURRA SOUND
20th Century
Steamship

HY 20 SE 8000 HY 2720 0490 NMRS No 115541
VIOLA: SCARATING, GRAEMSAY
20th Century
Steam Trawler

HY 20 SW 8860 HY 2459 0471 NMRS No 102319
GOBERNADOR BORIES: BURRA SOUND
20th Century
Steamship

HY 20 SW 8864 HY 2450 0498 NMRS No 102323
DOYLE: BURRA SOUND
20th Century
Steamship

HY 30 SE 8867 HY 3772 0428 NMRS No 102039
SCAPA FLOW
Obstruction

HY 30 SE 8870 HY 3618 0430 NMRS No 102328
SCAPA FLOW
20th Century
Craft

HY 30 SW 8703 HY 3153 0184 NMRS No 102166
BAYERN: SCAPA FLOW
20th Century
Battleship

HY 30 SW 8841 HY 3161 0002 NMRS No 102300
KAISER: SCAPA FLOW
20th Century
Battleship

HY 30 SW 8842 HY 3432 0008 NMRS No 102301
DRESDEN: SCAPA FLOW
20th Century
Cruiser

HY 30 SW 8845 HY 3136 0021 NMRS No 102304
PRINZREGENT LUITPOLD: SCAPA FLOW
20th Century
Battleship

HY 30 SW 8846 HY 3361 0048 NMRS No 102305
KONIG: SCAPA FLOW
20th Century
Battleship

HY 30 SW 8847 HY 3103 0074 NMRS No 102306
KAISERIN: SCAPA FLOW
20th Century
Battleship

HY 30 SW 8848 HY 3151 0082 NMRS No 102307
KARLSRUHE: SCAPA FLOW
20th Century
Cruiser

HY 30 SW 8851 HY 3285 0105 NMRS No 102310
MARKGRAF: SCAPA FLOW
20th Century
Battleship

HY 30 SW 8852 HY 3299 0129 NMRS No 102311
KRONPRINZ WILHELM: SCAPA FLOW
2oth Century
Battleship

HY 30 SW 8855 HY 3362 0162 NMRS No 102314
BRUMMER: SCAPA FLOW
20th Century
Cruiser

HY 30 SW 8856 HY 3427 0167 NMRS No 102315
KOLN: SCAPA FLOW
20th Century
Cruiser

HY 30 SW 8857 HY 3268 0170 NMRS No 102316
GROSSER KURFURST: SCAPA FLOW
20th Century
Battleship

HY 30 SW 8858 HY 3177 0172 NMRS No 102317
FRIEDRICH DER GROSSE: SCAPA FLOW
20th Century
Battleship

HY 30 SW 8859 HY 3126 0179 NMRS No 102318
KONIG ALBERT: SCAPA FLOW
20th Century
Battleship

HY 40 NE 8921 HY 4759 0887 NMRS No 102376
NANA: POINT OF GRIMSETTER, INGANESS BAY
20th Century
Tanker

HY 40 NW 8918 HY 4343 0518 NMRS No 102373
ROYAL OAK: SCAPA FLOW
20th Century
Battleship

HY 40 SE 8706 HY 4824 0117 NMRS No 102170
NUMIDIAN: CHURCHILL BARRIER NO.1, KIRK SOUND
20th Century
Steamship

HY 40 SE 8707 HY 4823 0117 NMRS No 102171
LAKE NUECHATTE: CHURCHILL BARRIER NO.1, KIRK SOUND
20th Century
Steamship

HY 40 SE 8910 HY 4782 0020 NMRS No 102365
ROSEWOOD: CHURCHILL BARRIER NO.2, SKERRY SOUND
20th Century
Steamship

HY 40 SE 8911 HY 4832 0050 NMRS No 102366
BUSK: CHURCHILL BARRIER NO.1, KIRK SOUND
20th Century
Steamship

HY 40 SE 8913 HY 4829 0069 NMRS No 102368
MINEH: CHURCHILL BARRIER NO.1, SKERRY SOUND
20th Century
Steamship

HY 40 SE 8915 HY 4812 0106 NMRS No 102370
SORIANO: CHURCHILL BARRIER NO.1, KIRK SOUND
20th Century
Steamship

HY 40 SE 8916 HY 4806 0117 NMRS No 102371
UNKOWN: CHURCHILL BARRIER NO.1, KIRK SOUND
20th Century
Ship

HY 40 SE 8917 HY 4833 0096 NMRS No 119018
REDSTONE: CHURCHILL BARRIER NO.1, KIRK SOUND
20th Century
Steamship

HY 40 SE 8918 HY 4795 0119 NMRS No 119019
GAMBHIRA: CHURCHILL BARRIER NO.1, KIRK SOUND
20th Century
Steamship

HY 40 SW 1 HY 4333 0097 NMRS No 102168
REDSTONE: SCAPA FLOW
20th Century
Steamship

HY 40 SW 8914 HY 4253 0086 NMRS No 102369
THAMES: CHURCHILL BARRIER NO.1, KIRK SOUND
20th Century
Steamship

HY 50 SW 8912 HY 5034 0063 NMRS No 102367
AORANGI: CHURCHILL BARRIER NO.1. KIRK SOUND
20th Century
Steamship

ND 28 NE 8946 ND 2867 8717 NMRS No 102995
AASE; BRIMS NESS

ND 39 NE 8710 ND 3610 9996 NMRS No 102174
SCAPA FLOW
Craft

ND 39 NE 8714 ND 3519 9937 NMRS No 102178
SCAPA FLOW
Obstruction

ND 39 NE 8715 ND 3510 9939 NMRS No 102179
SCAPA FLOW
Obstruction

ND 39 NE 8720 ND 3632 9830 NMRS No 102184
SCAPA FLOW
Craft

ND 39 NE 8721 ND 3602 9843 NMRS No 102185
SCAPA FLOW
Obstruction

ND 39 NE 8723 SCAPA FLOW Obstruction	ND 3706 9826	NMRS No 102187
ND 39 NE 8724 SCAPA FLOW Obstruction	ND 3793 9740	NMRS No 102188
ND 39 NE 8726 SCAPA FLOW Obstruction	ND 3724 9757	NMRS No 102190
ND 39 NE 8727 SCAPA FLOW Obstruction	ND 3683 9724	NMRS No 102191
ND 39 NE 8731 SCAPA FLOW Obstruction	ND 3612 9702	NMRS No 102195
ND 39 NE 8732 SCAPA FLOW Obstruction	ND 3693 9713	NMRS No 102196
ND 39 NE 8733 SCAPA FLOW Obstruction	ND 3601 9685	NMRS No 102197
ND 39 NE 8735 SCAPA FLOW Obstruction	ND 3692 9649	NMRS No 102199
ND 39 NE 8737 SCAPA FLOW Craft	ND 3678 9604	NMRS No 102201
ND 39 NE 8738 SCAPA FLOW Obstruction	ND 3510 9615	NMRS No 102202
ND 39 NE 8788 SCAPA FLOW Obstruction	ND 3606 9738	NMRS No 102251
ND 39 NE 8793 SCAPA FLOW Obstruction	ND 3505 9620	NMRS No 102256
ND 39 NE 8801 SCAPA FLOW Obstruction	ND 3784 9690	NMRS No 102263
ND 39 NE 8804 SCAPA FLOW Obstruction	ND 3565 9702	NMRS No 102266

ND 39 NE 8805 ND 3565 9726 NMRS No 102267
SCAPA FLOW
Obstruction

ND 39 NE 8810 ND 3518 9720 NMRS No 102272
SCAPA FLOW
Craft

ND 39 NE 8811 ND 3731 9722 NMRS No 102273
SCAPA FLOW
Craft

ND 39 NE 8814 ND 3791 9736 NMRS No 102276
SCAPA FLOW
Obstruction

ND 39 NE 8817 ND 3500 9767 NMRS No 103033
SCAPA FLOW
Obstruction

ND 39 NE 8818 ND 3540 9775 NMRS No 102279
SCAPA FLOW
Obstruction

ND 39 NE 8820 ND 3509 9792 NMRS No 102281
SCAPA FLOW
Obstruction

ND 39 NE 8954 ND 3621 9716 NMRS No 103004
HMS VANGUARD: SCAPA FLOW
20th Century
Battleship

ND 39 NW 8711 ND 3492 9962 NMRS No 102175
SCAPA FLOW
Craft

ND 39 NW 8712 ND 3483 9979 NMRS No 102176
SCAPA FLOW
Craft

ND 39 NW 8713 ND 3494 9922 NMRS No 102177
SCAPA FLOW
Obstruction

ND 39 NW 8716 ND 3405 9898 NMRS No 102180
SCAPA FLOW
Obstruction

ND 39 NW 8717 ND 3488 9907 NMRS No 102181
SCAPA FLOW
Obstruction

ND 39 NW 8719 ND 3486 9875 NMRS No 102183
SCAPA FLOW
Obstruction

ND 39 NW 8722 ND 3476 9851 NMRS No 102186
SCAPA FLOW
Obstruction

ND 39 NW 8725 ND 3350 9757 NMRS No 102189
SCAPA FLOW
Obstruction

ND 39 NW 8728 ND 3310 9730 NMRS No 102192
UNKNOWN: GUTTER SOUND
20th Century
Motor Torpedo Boat

ND 39 NW 8729 ND 3179 9723 NMRS No 102193
V129: PEAT BAY, FARA
20th Century
Destroyer

ND 39 NW 8730 ND 3337 9728 NMRS No 102194
SCAPA FLOW
Obstruction

ND 39 NW 8734 ND 3217 9701 NMRS No 102198
S136: GUTER SOUND
20th Century
Destroyer

ND 39 NW 8736 ND 3205 9658 NMRS No 102200
G92: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8743 ND 3467 9508 NMRS No 102208
UNKNOWN: WEST WEDDEL SOUND
Craft

ND 39 NW 8787 ND 3463 9517 NMRS No 103031
UNKNOWN: WEST WEDDEL SOUND
Obstruction

ND 39 NW 8789 ND 3101 9601 NMRS No 102252
UNKNOWN: GUTTER SOUND
Craft

ND 39 NW 8790 ND 3179 9668 NMRS No 102253
S52: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8791 ND 3473 9609 NMRS No 102254
PRUDENTIA: SCAPA FLOW
20th Century
Tanker

ND 39 NW 8792 ND 3130 9619 NMRS No 102255
V7: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8794 ND 3137 9637 NMRS No 102257
S53: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8795 ND 3205 9655 NMRS No 102258
G89: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8796 ND 3137 9656 NMRS No 102259
S55: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8797 ND 3137 9656 NMRS No 102260
G91: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8798 ND 3179 9664 NMRS No 103032
S36: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8799 ND 3173 9664 NMRS No 102261
S32: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8800 ND 3202 9697 NMRS No 102262
GUTTER SOUND
20th Century
Obstruction

ND 39 NW 8802 ND 3167 9702 NMRS No 102264
G86: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8803 ND 3167 9702 NMRS No 102265
G39: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8806 ND 3207 9716 NMRS No 102268
G35: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8807 ND 3206 9716 NMRS No 102269
S138: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8808 ND 3276 9722 NMRS No 102270
V38: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8809 ND 3177 9724 NMRS No 102271
G40: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8812 ND 3187 9735 NMRS No 102274
B110: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8813 ND 3187 9735 NMRS No 102275
B112: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8815 ND 3195 9747 NMRS No 102277
B109: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8819 ND 3055 9800 NMRS No 102280
DERFFLINGER: GUTTER SOUND
20th Century
Battlecruiser

ND 39 NW 8822 ND 3143 9816 NMRS No 102283
G104: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8823 ND 3144 9820 NMRS No 102169
G101: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8824 ND 3100 9820 NMRS No 102284
V83: SCAPA FLOW
20th Century
Destroyer

ND 39 NW 8825 ND 3473 9845 NMRS No 102285
SCAPA FLOW
Obstruction

ND 39 NW 8826 ND 3486 9850 NMRS No 102286
SCAPA FLOW
Obstruction

ND 39 NW 8827 ND 3189 9967 NMRS No 102287
SEYDLITZ: SCAPA FLOW
20th Century
Battlecruiser

ND 39 NW 8828 ND 3124 9597 NMRS No 119012
F2: GUTTER SOUND
20th Century
Escort

ND 39 NW 8829 ND 3095 9598 NMRS No 119013
YC21: GUTTER SOUND
20th Century
Barge

ND 39 NW 8830 ND 3161 9810 NMRS No 102282
G103: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8831 ND 3164 9897 NMRS No 102291
MOLTKE: GUTTER SOUND
20th Century
Battlecruiser

ND 39 NW 8832 ND 3464 9893 NMRS No 102292
SCAPA FLOW
Obstruction

ND 39 NW 8833 ND 3422 9908 NMRS No 102293
SCAPA FLOW
Craft

ND 39 NW 8834 ND 3489 9933 NMRS No 102294
SCAPA FLOW
Craft

ND 39 NW 8835 ND 3167 9943 NMRS No 102295
HINDENBURG: GUTTER SOUND
20th Century
Battlecruiser

ND 39 NW 8836 ND 3146 9949 NMRS No 102296
VON DER TANN: SCAPA FLOW
20th Century
Battlecruiser

ND 39 NW 8838 ND 3223 9964 NMRS No 102298
NURNBERG: NORTH HOUSE, CAVA, GUTTER SOUND
20th Century
Light Cruiser

ND 39 NW 8839 ND 3491 9964 NMRS No 102299
SCAPA FLOW
Obstruction

ND 39 NW 8868 ND 3138 9510 NMRS No 102326
B109: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8877 ND 3449 9886 NMRS No 102335
SCAPA FLOW
Obstruction

ND 39 NW 8929 ND 3229 9741 NMRS No 102792
S56: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8935 ND 3484 9702 NMRS No 102984
SCAPA FLOW
Obstruction

ND 39 NW 8950 ND 3141 9680 NMRS No 102999
G38: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8951 ND 3217 9701 NMRS No 103001
H145: GUTTER SOUND
20th Century
Destroyer

ND 39 NW 8953 ND 3198 9741 NMRS No 103003
B111: GUTTER SOUND
20th Century
Destroyer

ND 39 SE 8786 ND 3833 9471 NMRS No 102250
UB 116: SCAPA FLOW
20th Century
Submarine

ND 39 SW 8777 ND 3281 9245 NMRS No 102241
HMS ROEDEAN: LONGHOPE
20th Century
Minesweeper

ND 39 SW 8949 ND 3169 9454 NMRS No 102998
IMBAT: GUTTER SOUND
20th Century
Requisitioned Drifter

ND 39 SW 8950 ND 3 9 NMRS No 119014
GUTTER SOUND
20th Century
Cargo; Vessel Equipment

ND 49 NE 8709 ND 4826 9976 NMRS No 102173
ALMERIA: CHURCHILL BARRIER NO.2, SKERRY SOUND
20th Century
Steamship

ND 49 NE 8718 ND 4725 9855 NMRS No 102182
EMPIRE SEAMAN: CHURCHILL BARRIER NO.3, EAST WEDDEL SOUND
20th Century
Steamship

ND 49 NE 8739 ND 4797 9503 NMRS No 102203
PONTOS: CHURCHILL BARRIER NO.4, WATER SOUND
20th Century
Steamship

ND 49 NE 8740 ND 4802 9515 NMRS No 102204
UNKNOWN: CHURCHILL BARRIER NO.4, WATER SOUND
Craft

ND 49 NE 8741 ND 4803 9532 NMRS No 102206
CARRON: CHURCHILL BARRIER NO.4, WATER SOUND
20th Century
Steamship

ND 49 NE 8744 ND 4792 9500 NMRS No 102209
COLLINGDOC: CHURCHILL BARRIER NO.4, WATER SOUND
20th Century
Steamship

ND 49 NE 8895 ND 4796 9505 NMRS No 102350
CLIO: CHURCHILL BARRIER NO.4, WATER SOUND
20th Century
Steamship

ND 49 NE 8896 ND 4796 9509 NMRS No 102351
CAROLINA THORDEN: CHURCHILL BARRIER NO.4, WATER SOUND
20th Century
Tanker

ND 49 NE 8897 ND 4807 9519 NMRS No 102352
NAJA: CHURCHILL BARRIER NO.4, WATER SOUND
20th Century
Barge

ND 49 NE 8898 ND 4799 9522 NMRS No 102353
LORNE: CHURCHILL BARRIER NO.4, WATER SOUND
20th Century
Steamship

ND 49 NE 8899 ND 4745 9845 NMRS No 102354
REGINALD: CHURCHILL BARRIER NO.3, WATER SOUND
20th Century
Schooner

ND 49 NE 8900 ND 4731 9849 NMRS No 102355
MARTIS: CHURCHILL BARRIER NO.3, EAST WEDDEL SOUND
20th Century
Steamship

ND 49 NE 8901 ND 4735 9853 NMRS No 102356
GARTSHORE: CHURCHILL BARRIER NO.3, EAST WEDDEL SOUND
20th Century
Steamship

ND 49 NE 8902 ND 4735 9853 NMRS No 102357
LAPLAND: CHURCHILL BARRIER NO.3, EAST WEDDEL SOUND
20th Century
Steamship

ND 49 NE 8903 ND 4736 9962 NMRS No 102358
AC6: CHURCHILL BARRIER NO.2, SKERRY SOUND
20th Century
Barge; Floating Crane

ND 49 NE 8904 ND 4808 9964 NMRS No 102359
ARGYLE: CHURCHILL BARRIER NO.2, SKERRY SOUND
20th Century
Steamship

ND 49 NE 8905 ND 4823 9968 NMRS No 102360
EMERALD WINGS: CHURCHILL BARRIER NO.2; SKERRY SOUND
20th Century
Steamship

ND 49 NE 8906 ND 4818 9976 NMRS No 102361
RHEINFIELD: CHURCHILL BARRIER NO.2, SKERRY SOUND
20th Century
Steamship

ND 49 NE 8907 ND 4825 9981 NMRS No 102362
ILSENSTEIN: CHURCHILL BARRIER NO.2, SKERRY SOUND
20th Century
Steamship

ND 49 NE 8908 ND 4825 9981 NMRS No 102363
ELTON: CHURCHILL BARRIER NO.2, SKERRY SOUND
20th Century
Steamship

ND 49 NE 8909 ND 4817 9995 NMRS No 102364
LYCIA: CHURCHILL BARRIER NO.2, SKERRY SOUND
20th Century
Ship

ND 49 NE 8933 ND 4828 9993 NMRS No 102967
TEESWOOD: CHURCHILL BARRIER NO.2, SKERRY SOUND
20th Century
Steamship

ND 49 NE 8955 ND 4812 9518 NMRS No 103005
JUANITA: CHURCHILL BARRIER NO.4, WATER SOUND
20th Century
Tanker

ND 49 NE 8956 ND 4825 9981 NMRS No 119032
CAPE ORTEGAL: CHURCHILL BARRIER NO.2, SKERRY SOUND
20th Century
Steamer

ND 49 SE 8894 ND 4810 9490 NMRS No 102349
GONDOLIER: CHURCHILL BARRIER NO.4, WATER SOUND
20th Century
Paddle Steamer

Appendix 2: Contact List

Marion McQuad
Sec (NS) A3
Room 8388
Main Building
Ministry of Defence
Whitehall
London SW1A 2HW
Tel: 0171 218 7725

Queen's Harbour Master
HM Naval Base
Rosyth
Tel: 01383 412121

Secretary of the Naval Historical Branch
Tel: 0171 218 9000

Orkney Tourist Board
9 Broad Street
Kirkwall
Orkney KW15 1NX
Tel: 01856 872856
Fax: 01856 875056

Orkney Tourist Board (Stromness)
The Ferry Terminal Building
Pier head
Stromness
Tel: 01856 850716

Orkney Health Board
Tel: 01856 885549

Maureen Sinclair
Stromness Medical Practice
Tel: 01856 850205

Gerry Hazard
British Sub Aqua Club
Ellesmere Port
Tel: 0151 357 1951

Bobby Forbes
International Centre for Island Technology
Department of Civil and Offshore Engineering
Herriot Watt University
Old Academy Building
Back Road
Orkney KW16 3AW
Tel: 01856 850605
Fax: 01856 851349

Captain Slater
Harbourmaster
Department of Harbours
Orkney Island Council
Harbour Authority Building
Scapa
Tel: 01856 873636

Appendix 3: Worldwide Web information for the Full Fathom Five National Marine Park from Parcs Canada and local Tourist Information Service

Canadian Heritage | Parks Canada

National Marine Conservation Areas

What are National Marine Conservation Areas?

In 1986, in response to growing international and Canadian concern about the protection of the marine environment, Canada initiated a national marine park program. Since then it has been renamed the National Marine Conservation Area (NMCA) program in recognition that conservation through shared stewardship should be the main focus in the planning and management of these areas.

The purpose of the NMCA program is to protect and conserve for all time a system of special marine areas representative of Canada's oceans and Great Lakes and to provide opportunities for public understanding, appreciation and enjoyment of the country's natural and cultural marine heritage. To do this, Canada's oceans and Great Lakes have been divided into 29 marine natural regions based on their natural features. Canadian Heritage (Parks Canada) is working to establish NMCAs that represent each of these regions.

Conceptually, NMCAs contain one or more highly protected core areas buffered by cooperatively managed multiple use areas. NMCAs include the sea bed, its subsoil and the overlying water column. In coastal areas, they may include wetlands, river estuaries, islands and other coastal lands. However they may also be established wholly offshore.

In contrast to national parks where the primary goal is to protect ecosystems in a state essentially unaltered by human activity, in NMCAs only activities such as ocean dumping, seabed mining and oil and gas extraction would be totally prohibited. Outside of core areas, activities such as commercial shipping, commercial and recreational fishing and hunting would be permitted provided that these uses will not seriously degrade the essential structure and function of the area's ecosystems.

Extent of the System of National Marine Conservation Areas

The NMCA program is relatively young. To date, only five of the 29 marine regions are represented by four sites. Fathom Five (130 sq. km.), in Georgian Bay was established as the country's first NMCA in 1987. This was followed, in 1988, by an agreement to establish Gwaii Haanas NMCA Reserve (3050 sq. km.) off the Queen Charlotte Islands of British Columbia. This site represents both Hecate Strait and the Queen Charlotte Islands natural regions. In 1990, an agreement was signed with Quebec calling for the establishment of a marine park (1138 sq. km.) at the confluence of the Saguenay fiord and the St. Lawrence River. The marine components to Pacific Rim National Park Reserve (200 sq. km.) provide partial representation of the Vancouver Island Shelf Natural Region. It is hoped that eventually these boundaries will be extended off shore allowing the area to be designated as an NMCA.

In 1990 the federal government announced plans to create an additional four NMCAs by the year 2000. Studies in three marine regions are well advanced and seem promising. Area

selection studies are to be completed in several other marine regions over the next few years.

Cooperative Management

Five species of cetacean occur regularly in the waters of the Saguenay – St. Lawrence Marine Park: harbour porpoise, beluga whales, minke whales, fin whales and blue whales. Each summer, whale watching attracts thousands of visitors to the park. In 1994, a cooperative whale research program was initiated involving local whale watching tour operators, the Groupe de Recherche et d'education sur le Milieu Marin (GREMM), the Ministère de l'Environnement et de la Faune du Québec, the Department of Fisheries and Oceans, and Canadian Heritage (Parks Canada). The research is required to determine the abundance and distribution of cetaceans, to better understand factors affecting spatial and temporal configuration of their feeding areas, to monitor the movements and diving behaviour of fin whales, and finally, to gain a better understanding of the interaction between whales and the whale watchers.

Tour operators play an important role in this program by allowing observers on their boats and by collaborating with scientists to help attach radio transmitters to fin whales. They help also by explaining the research program to visitors. It is hoped that the results of this research program will provide the baseline information required to ensure that whale watching activities continue while at the same time ensuring the whales are properly protected.

Dave McBurney,
National Parks Directorate,
Parks Canada

Home

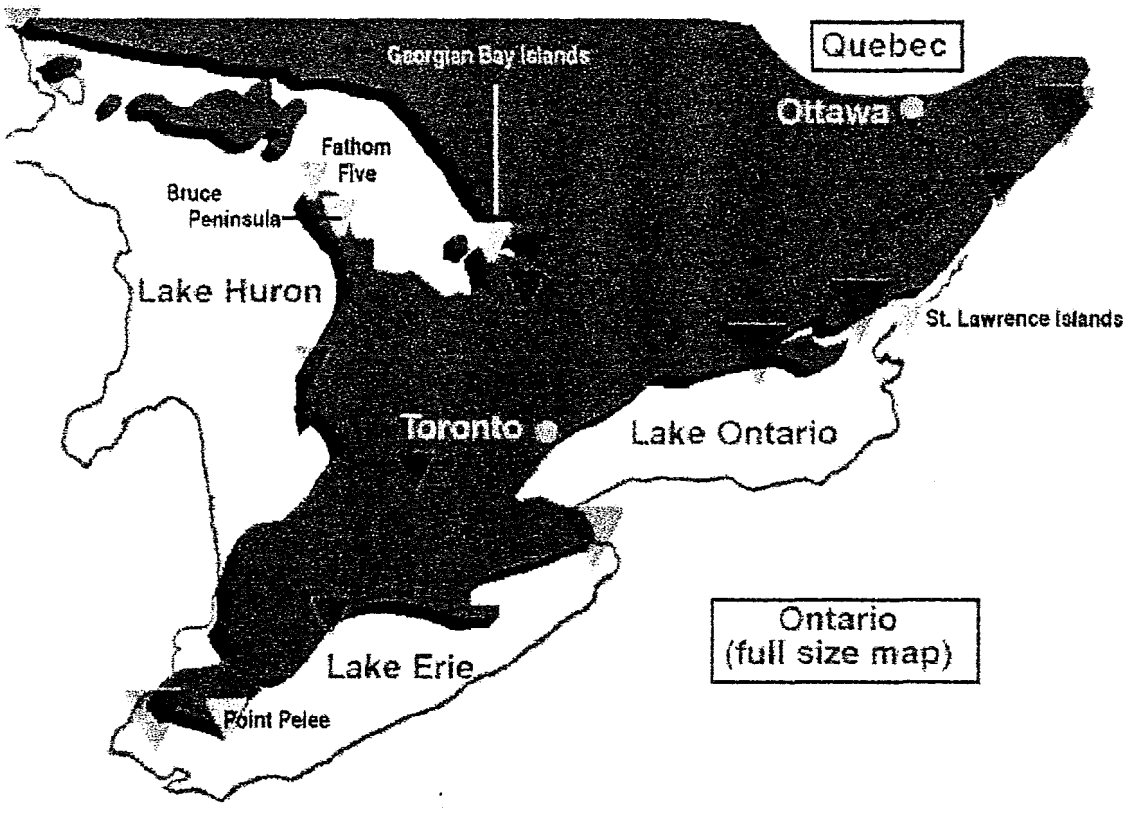
Information last updated May 16, 1996.
Questions and comments can be directed to a Parks Canada representative.

Canada

Canadian Heritage | Parks Canada | National Parks

Ontario (close-up)

National Parks



To go to a particular location, just click on the map symbol or text.

Legend	
▼	**Small red triangle indicates one National Historic Site, accessible through the National Historic Site map**
▼	**Large red triangle indicates two or more National Historic Sites, accessible through the National Historic Site map**
●	**Other heritage places, accessible through the National Historic Site map**
▼	**Blue symbol indicates a National Marine Conservation Area**
▬	**Green areas are National Parks**

How to Reach Us

Fathom Five National Marine Park

Mailing address:
Fathom Five National Marine Park
P.O. Box 189
Tobermory, Ontario
N0H 2R0

Telephone: (519) 596-2233

Fax: (519) 596-2298

Information last updated June 9, 1997.
Questions and comments can be directed to a Parks Canada representative.

Canada

Original
The Tobermory Home Page!

Tobermory, Ontario CANADA

Bruce Peninsula National Park

Fathom Five National MarinePark

- **Bruce Peninsula National Park - Cyprus Lake - three lakes, trails, hiking, camping....**
- **Fathom Five National Marine Park - nineteen islands and magnificent shoreline of the Niagara Escarpment**
- **Flowerpot Island - See the Flowerpots, hike the trails, visit the lighthouse keeper's home, picnic, limited camping.**
- **Shipwrecks & Dive Sites - twenty-five shipwrecks to dive on and other popular sites.**
- **Trails - Bruce Trail, Cyprus Lake, Singing Sands, Flowerpot Island**
- **More Parks and Trails Info - how to contact them**
- **Return to Main Menu**

Bruce Peninsula National Park

Photos: Lake Huron Shoreline. Georgian Bay shoreline at Dave's Bay.

The Bruce Peninsula National Park is one of two national parks at the tip of the Bruce just ten kilometres south of Tobermory. It is often called "Cyprus Lake" because the campgrounds are located there, although that area makes up only a small part of the park's properties.

Camp under the trees in natural wilderness setting in one of 242 unserviced campsites. Each site has a fire pit and table. Water taps and washrooms are nearby, but there is no electricity.

Swim, canoe, sail or fish for bass, perch and yellow pickerel in Cyprus Lake, one of three inland lakes in the park (Horse Lake and Marr Lake being the other two) or take a dip at Singing Sands Beach at Dorcas Bay on the other side of highway #6 just north of the park. This sandy beach is very shallow for many hundreds of feet out - ideal for young children.

View some of the best scenery in the peninsula along the Georgian Bay coast, accessible by boat or the many trails including the Bruce Trail and Cyprus Lake trails. See the limestone cliffs, forests, Niagara Escarpment or boulder and cobblestone beaches. You will be impressed by the beauty as well as the clear blue water, clean blue skies and the large variety of wildflowers.

The park also runs many activities throughout the summer including campfires, shows at the amphitheatre, guided hiking tours and lectures about Fathom Five Park aboard the M.S. Chi-Cheemaun. There is always something interesting and exciting to do there. It is open all year round. In winter, there is camping, cross-country skiing and snowshoeing.

This is a very popular place to camp during the summer and is usually booked solid for several weeks in advance so call ahead and make reservations.

During the summer months, the Parks have a visitor's centre right at the foot of Little Tub Harbour which has displays and information about the two parks.

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Fathom Five National Marine Park

Photo: SCUBA Diver explores underwater geology near the lighthouse.

Covering a roughly triangular shaped area from Cape Hurd to Cove Island to Bears Rump Island and back, Fathom Five is Canada's first national marine park. It encompasses 19 islands, Flowerpot Island being the best known, and there are over twenty shipwrecks in the waters of the park.

The geological features of the Niagara Escarpment including underwater caves, glacial features and the shipwrecks (many in shallow water) combined with the exceptional visibility in the cool, clean water make this one of North America's most popular sites for sport divers. Many dive schools and clubs carry out diver checkouts here every weekend during the summer.

To dive in the park, you must be a certified diver or under instruction from a qualified instructor and you must register at the Diver's Registration Office (East side of Little Tub Harbour) prior to your first dive of the year. There is a nominal $8 yearly registration fee.

The islands offer boaters some very exciting scenery - limestone cliffs capped by spruce and cedar trees, the most spectacular being Flowerpot Island with its two rock monoliths on its eastern shore. Boaters can land at Flowerpot or visit the lighthouse at Cove Island, explore the inland coves and bays along the shorelines or fish the waters. There are also boat tours and charters which can be taken around the islands and shipwrecks, to Flowerpot Island, or down along the Georgian Bay coast.

The islands of Fathom Five (and Manitoulin Island itself) are extensions of the Niagara Peninsula and the underwater geology is just as rugged as what you see above water - sharply rising vertical rock cliffs which can make navigation of some parts of these waters treacherous, especially in rough weather (the many shipwrecks attest to that). The weather here can turn very nasty very quickly and even to this day many an unwary sailor has struck the rocky shoals and foundered. During heavy storms in November and April, it is said waves can reach 30' (9m) high!

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Flowerpot Island

Photos: Big Flowerpot and Little Flowerpot.

Located approximately 3 miles (5km) off of Tobermory and within the boundaries of Fathom Five National Park, Flowerpot Island itself is a very popular attraction for tourists, photographers and botanists.

The most prominent features on the island are the two sea stacks, one standing 40' (12m) and the other 23' (7m) on the eastern shore which to some resemble flowerpots. As the lake levels dropped over several thousands of years, these monoliths were carved out of the rock by erosion of softer rock by the action of the water. If you look at the upper portion of the big flowerpot, some say you can see the face of an Indian chief looking out to sea.

The eastern shoreline resembles the very rugged shores of the Georgian Bay near Cyprus Lake (Bruce Peninsula National Park) and offers spectacular scenes for painters, photographers and sketch artists (as do the other shores) as do the scenes of the inner forests. The waters close to shore are green, turning deep blue a short ways out as they plummet to almost 300' (90m) and the rocks vary in colour from almost white to dark grey-black. When combined with the deep blue of a summer sky the settings are unforgettable.

At times when the lake level is a little lower, you can hike the shoreline right out to the flowerpots, although there is access to them along the trails which is easier and much safer. You can also picnic on the shore near Beachy Cove where the tour boats drop you off - there is a boardwalk, barbecues and a picnic shelter with tables.

There are three main trails - the lighthouse trail to the lighthouse keeper's residence and lighthouse (of course), the loop trail which takes you past the flowerpots and caves then inland about a third of the way and returns to Beachy Cove, and the Marl Trail to the Marl Beds on the south side of the island.

During your walks around the islands, you may see plenty of interesting and unusual flowers. In early June the Calypso orchids bloom. Small and rare, they are pink and yellow. This is one of the few known places they grow. Other less interesting orchids bloom throughout the year. There are also blue harebells, indian pipe, about 20 varieties of ferns and lots of varieties of mosses growing on the rocks and trees. The oldest known living tree in Canada, a 5' (1.5m) tall 1,645 year old cedar grows on the island.

Water snakes up to about 3' (.9m) in length inhabit areas by the shore and plenty of garter snakes inland. They are harmless and won't bother you if you don't bother them. Just make noise and they run. There are also plenty of small red squirrels - they will often come right up to people around the picnic shelter. Other oddities to look out for are the many cedar trees which are growing right out of cracks in rocks, apparently with no soil whatsoever and the large square bolders along the shoreline that look as if cut by hand.

There are six campsites available on a first-come basis on the island, washrooms, running water and firewood (check at the diver registration building at Little Tub Harbour for campsite availability). Access to the island is by private boat or tour boats. The park also runs guided tours of the island. It is an enjoyable place to spend a half or whole day exploring. Be sure to bring along your camera, some food and something to drink.

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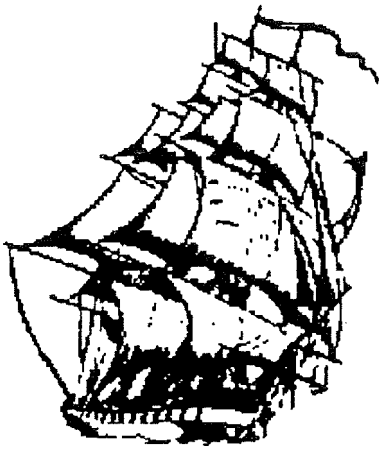
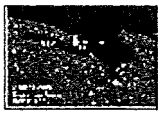
Shipwrecks and Other Dive Sites

The combination of often vertically rising rock cliffs of the Niagara Escarpment and the severity of weather conditions, particularly during the winter months, makes this part of the lakes treacherous for mariners. Over the last century many ships have been wrecked and their remains can be visited by Boat Tours or SCUBA Diving





Harbour Wrecks

Big Tub Harbour

These wrecks are not deep, and can be easily reached by boat. Many of the Flowerpot Island glass-bottom boat tours visit these two wrecks. Shore access is restricted because surrounding property is privately owned.

Divers and snorkelers note: Because of tour boat activity, access to Sweepstakes and City of Grand Rapids is restricted to certain hours of the day. **Between the last Friday in June to Labour Day Monday inclusive**, the wrecks are reserved for *tour boats only* Monday through Saturday 9:00am through 4:00pm and Sunday between 1:00pm and 4:00pm and for *divers only* every day from 4:00pm through 10:00pm and between 9:00am and noon on Sundays. **Outside these dates**, the sites are shared by divers and boat operators between 9:00am and 10:00pm. These rules are strictly enforced and violators will be fined.

1. SWEEPSTAKES - schooner. Built in Burlington, Ontario in 1867, with a length of 119' (36.3m), it was stranded at Cove Island in August of 1885. It was subsequently towed to the foot of Big Tub Harbour where it sank prior to completion of salvage operations and was abandoned. The hull is fairly intact and now lies in 20' (6.5m) of water and can be seen by divers, snorkeling and glass-bottom tour boat. Due to decomposition caused by trapped oxygen, divers are not permitted to enter this wreck anymore.

2. CITY OF GRAND RAPIDS - steamer. Built in Grand Haven, Michigan, in 1879, with a length of 122' 6" (37.3m), it burned and sank at the foot of Big Tub Harbour in 1907. It lies in about 15' (5m) of water and can also be seen by divers, snorkeling and glass-bottom tour boat. Most of the hull below the waterline including parts of the boiler can be seen. Its propellor and rudder are on display outside the St. Edmunds Township Museum on Hwy. #6, just south of Tobermory.

Little Tub Harbour

There are four wrecks located close together at the eastern side of Little Tub Harbour. Access to these wrecks is from the diver's platform at the northern end of the harbour walkway or from Lee's docks at the southern end. They are in shallow water and are also excellent for snorkeling.

3. JOHN AND ALEX - the 59' (17.3m) steam powered fishing tug was built in Port Dover, Ontario in 1924, and destroyed by fire on Dec. 6, 1947. A 50' section of the bottom of the hull is still intact and the stern is visible just above the water. Smaller sections of the sides and keel rest nearby.

4. ROBERT K. - built in 1917, also in Port Dover, was destroyed by fire in 1936.

5. BOB FOOTE - little is known about the wreck other than it sank in 1905. The wreckage measures 56' long and 30' wide. The sides and deck have collapsed.

6. ALICE G. - a 67' (19.7m) steam powered fishing tug built in Collingwood, Ontario, tore loose

from her moorings during a gale in November 1927 and was slammed against the rocks and sunk. This wreck is nearly intact, and its steam engine, boiler, driveshaft and propellor remain.

Other Shipwrecks

7. CASCADEN - schooner. Built in 1866 in Southampton, Ontario, the ship was wrecked in October of 1871 near Cape Hurd. The wreckage is badly broken up and spread over a large area.

8. CHINA - this 137' (42m) schooner was built in 1863 in Port Robinson, Ontario. It ran aground on a reef now bearing its name in bad weather in November 1883. A 70' (20.6m) section of hull is the largest section of the badly broken up wreckage which lies in approximately 10' (3m) of water.

9. JOHN WALTERS - this 108' (33m) two-masted schooner built in Picton, Ontario in 1852, was wrecked in a narrow channel at the southern end of Russel Island in 1899. A 109' section of hull bottom lies in 15' (5m) of water.

10. W.L. WETMORE - steamer, 214' (65m) long, built in Cleveland, Ohio. Caught in a winter storm on November 29, 1901 while towing two timber-laden schooners, the three all ran aground off Russel Island's Western shore. Large amounts of timber and wreckage including the boiler are still in place. At 30' (10m) deep, this is considered one of the best wrecks to dive in Tobermory.

11. JAMES C. KING - this was one of the schooners in tow by the W.L. Wetmore when it went aground. It's length was 175' 3" (53.4m), and was built in East Saginaw, Michigan. It now lies in 25' - 95' (7m - 30m) of water. It is not recommended for beginning divers.

12. NEWAYGO - the wreck of this 196' (57.6m) steamer, built in Marine City, Michigan in 1890, lies in 15' - 25' (4.5m - 7m) of water on the Southeast end of the Northwest Bank on the west side of Cove Island. The ship ran aground on November 17, 1903 during a storm. A 160' (47m) section of the hull, lower section of the bow and boiler remain.

13. PHILO SCOVILLE - this schooner, built in Cleveland, Ohio in 1863 measured 139' 6" (41m) went aground during a storm on Ocrober 6, 1889. She was broken up and wreckage now lies on a steep incline at depths from 25' to 95' (7m to 30m). This site is not recommended for novices.

14. CHARLES P. MINCH - a 154' (47.2m) schooner built in Vermillion, Ohio in 1867, the Minch was driven into rocks and broken up in October, 1898. This is a popular dive site for all levels of experience.

15. ARABIA - a three-masted barque 131' (40m) long, built in Kingston in 1853. The Arabia foundered in open water during a storm and sank. One story suggests its cargo of grain got wet, expanded and burst the seams of the hull causing it to take on water and sink. It lies in 120' (37m) of water and is an excellently preserved wreck. There are strong currents in the area and this site is recommended for advanced groups under the direction of a dive master.

16. MARION L. BRECK- a 127' (38.7m) schooner built in 1840 and originally named the William Penn. It struck the rocky shoals of Bear's Rump Island and broke up. The wreckage lies in 90' (28m) of water and is not a popular site. It is recommended for experienced divers only.

17. FOREST CITY - this 216' (66m) steamer, built in Cleveland, Ohio in 1870, struck the shore of Bear's Rump Island in June 1904, slid off and sank. Wreckage lies in water 60' to 150' (18m to 46m) deep and is recommended for highly advanced divers only.

18. AVALON VOYAGEUR - a propellor motor freighter of 135' (41.2m) length, built in Clarenville, Newfoundland in 1947. On October 1980, it was at anchor and drifted into the rocks. In 1982, vandals set the wreck afire and now only a portion remains in water up to 25' (8m) deep.

19. LADY DUFFERIN - the 135' (41.2m) schooner, built in Port Burwell, was in tow in October 1886 when she broke the lines and was swept into the rocks of Dufferin Point. The broken wreckage lies on an incline between 40' and 100' (11.8m and 29m) deep.

20. CITY OF CLEVELAND - a propellor steamer of 255' (75m) length, built in Cleveland, Ohio in 1882. On September 15, 1901, it was blown off course by a gale and struck the ledges of Perserverance Island near Manitoulin Island. It now lies, hull almost intact, in water of 10' to 30' (3m to 9m). The sides and deck have collapsed, and the engine room with all its equipment exposed.

21. GAT POINT WRECK - a 60' (19m) hull section of an unknown sailing vessel in 10' (3m) of water.

22. CASSLE'S COVE WRECK - a 90' section of hull from an unidentified sailing ship lies in depths from 50' to 70' (14.7m to 20.6m).

23. THE POINTS WEST - a 32' (10m) wooden guide boat, built in Tobermory in 1956, was scuttled in 50' (14.7m) of water and lies intact.

24. CAROLINE ROSE - this 135' (41m) sailing craft, built in Lunenburg, Nova Scotia in 1940, was deliberately submerged in driftwood cove specifically for divers. It lies intact in about 60' (18m) of water and is considered an excellent dive site.

25. UNIDENTIFIED WRECK - a wreck of unknown origin lies off the Northeastern coast of Cove Island approximately half way between Eagle Point and Cove Island Lighthouse.

Additional Popular Dive Sites

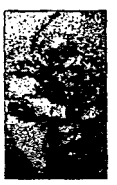


Photo: Hardhat Diver enters harbour during Marine Heritage Weekend festivities.

26. BIG TUB LIGHTHOUSE - the Big Tub Lighthouse was built in 1885. Interesting geological features can be seen down to a depth of 75' (21m). Many dive clubs and schools train divers at this site.

27. THE ANCHOR - a large wooden-stocked iron anchor from an unknown vessel lies in 70' (21m) of water. The site can be accessed from a gap right at the end of Highway #6.

28. THE CAVES - located along the cliffs of Cyprus Lake campground, these are best reached from boat. Entrance is about 20' (6m) below the surface.

29. DAVE'S BAY (LITTLE COVE) - interesting geological formations and glacial features can be found along the south shore at depths to 40' (13m). This site is very popular for dive clubs and checkouts - particularly on Saturday mornings.

30. DUNK'S POINT - Interesting geological features can be found at depths up to 40' (13m). For divers of all experience levels, although access is by boat only.

31. FLOWERPOT ISLAND - the southeast shoreline of the island offers rock ledges and vertical cliffs down to 200' (59m).