NORFOLK BROADS ENVIRONMENTS

Case Study of

q A wetland ecosystem

q Management of an ecosystem

q Impact of people on an environment

Norfolk Broads - Key facts

q 41 Lakes set in 2,000 hectares of farmland along valleys of Rivers Bure, Yare, Waveney

q There are 200 kilometres of navigable rivers within the Broads.

q It was the 11th National Park to be designated in England and Wales. It is the only lowland National Park.

q There are 3 National Nature Reserves and 36 Sites of Special Scientific Interest.

q It was formed from old Medieval peat diggings - sea water gradually flooded hollows.

q In the fen areas there are 250 plant species alone.

q As there are no similar wetlands in Britain The Norfolk Broads have twinned with Marais Audomarois in France and Weerribbeen in Netherlands.

q There are 320 kilometres of footpaths in the Broads.

Main sources of pressure on the Broads

q **TOURISM**

q **FARMING**

Impact of people - tourism

More visitors go to the Broads each year. More car parks and visitors' centres have been built. These new facilities attract even more users. Holidaymakers using boats increase the demand for public toilets, showers, launderettes, shops, cafes, souvenir shops. Increasing numbers of summer visitors demand accommodation in camp sites, caravan parks, guest houses, self catering. An in depth report on National Parks referred to "Loving Them To Death"

Gains

q **Multiplier Effect** - each hire boat generates about ?10,000 of spending in the local economy - spent in pubs, boat hire, shops, garages, restaurants, cafes, gift shops, TV equipment rentals etc....

q **Employment -** Between 5,000 and 5,500 jobs in the area depend on boat hire alone. In 1988, the hire boat industry brought ?15 millions of income to the Broads area. The hire boat industry creates between 5,000 and 5,500 jobs.

q **Encouragement of rural crafts -** and traditions which are carried out to show tourists and sold to tourists.

q **Education -** visitor centres educate people about the history and ecosystem of the Broads wetland

Losses

q **Nutrient Enrichment (Eutrophication) - sewage from boats** gets into the Broads. Sewage contains **phosphates**. Excess phosphates are a problem: **algae** feed on phosphates - algae survive & multiply using up oxygen. This makes it difficult for other species which need oxygen too, to survive. Species die out or move to colonise another area of the Broads. There is a less varied **ecosystem**.

q On some Broads there is too much traffic. Boat users cruising around sometimes get in the way of other Broads users. Motor boats may **conflict** with those of sailing boats.

q Peat and sand banks of the Broads are being eroded by the wash from boats using the Broads. This is disturbing the **habitats** and nesting places of birds, water voles and other wildlife of the Broads.

q The material eroded is settling on the bed of the Broads and making these shallower. This may encourage evaporation in summer months.

q Eroded **sediment** is held in suspension in the water. This makes the water cloudy and murky. Underwater plants need sunlight to **photosynthesise.**

q **Villages & main town, Wroxham have become honeypot sites**. This means it is very attractive to visitors and draws crowds of people like bees round a honeypot. There are many facilities for tourists in Wroxham: cafes, gift shops, antique shops, boat hire offices, marinas, car parks, accommodation. As a result Wroxham has become very **congested** with traffic and visitors walking along the narrow roads. The tourist industry is very important to the local economy.

q Many of the **visitors to the area do not realise the impact they have**. They are not aware of how **fragile** the ecosystem is.Many do not know about the history, wildlife and **conservation issues** in the Broads.

q **Jobs are seasonal** - much of the work is available only 22 weeks a year (April to September) The season has shortened since 1970's (27 weeks) as a result of popularity of foreign holidays.

Impact of people - farming

2 main issues

1. artificial fertilisers used in arable farming

2. drainage of marshlands to arable crop land

Nutrients are lost from the soil when arable crops are grown so farmers either plant root crops the following year in a"crop rotation" or use artificial fertilisers. In the 1970's and 1980's arable (grain) crops were very profitable and had subsidies from the EC. Many farmers chose to grow these year after year rather than use a **crop rotation** to maximise profits. Farmers also realised it was more profitable to drain marshland used for grazing and convert it to arable crops too. These trends were leading to increased pollution and a loss of wildlife habitats such as marshland and dykes in the late 1970's and early 1980's.

Artificial fertilisers - nitrates and phosphates are put into the rivers and Broads by**overland flow** or **surface run - off** (streams and rivers across the surface) and **groundwater** (movement of water in soil and rock).

Management problems for Broads Authorities

Problem 1 - Bank Erosion

Main cause is wash from boats, particularly motor boats. In the 1980's loss was as much as 1.6 metres every 10 years. It is worse where there is no fringe of reeds to absorb the energy of the wash.

Solutions:

- **Steel piling** along banks but ugly & expensive, look unnatural as reeds won't grow there

- **Geotextile matting** which protects soil from erosion but has holes which allow vegetation to grow and consolidate the banks**.**

- **Open cell concrete blocks -** honeycomb appearance allows plants to grow in spaces

- **Gabion cages** - very expensive & give an unnatural appearance. In time plants may colonise spaces in baskets if soil can accumulate in pockets between rocks.

- **Recycled tyres** below water line are cheap, absorb wash effectively & allow reed beds to grow in central cylinder of tyres.

- **Speed limits** of 5 m.p.h. on rivers and open broads, 4 m.p.h. elsewhere.

- **Wash free zones** - areas where boat users are obliged to reduce wash

Problem 2 - Diesel& other oil based substances from cruise hire boats in particular, waiting for refuelling. Washing up liquid and other oil based products. The oily film on the surface reduces oxygenation of the water. Oil which leaks from engines is collected in drip trays and these can overflow into the boats bilges. If this happens the oil along with the water gets pumped out into the Broads.

Solutions:

- Shops supplying boats are encouraged to stock "eco friendly" detergents

- Leaflets handed out to tourists hiring boats to educate about nutrient enrichment & impact of oil based products

- Resticted access points for fuels

- Research into double lined hulls & holding tanks which have to be emptied under control

- Investment into better sewage disposal systems at boatyards.

- Research into fitting all boats with holding tank toilets.

Problem 3 - Marsh Drainage

Between 1940 and 1981 more than 750,000 hectares of land in the UK was drained. This was mainly from the conversion of grazing land to arable or crop farming as it was more profitable. Wading birds were lost from many Broad areas. Water in the drainage dykes fell and grasses invaded the exposed land. Nutrients became more concentrated in the smaller amount of water. Surveys in 1988 and 1989 showed many species had been lost.

Solution:

- EC grants given to farmers to stop draining marshes

Problem 4 - Agricultural sewage waste in rivers

Phosphates come from human and animal sewage washed into the Broads. Some animal slurry has been deliberately washed in by farmers. The high ammonia content is very damaging to fish. In the 1980's 200 farms were visited and 15 pollution cases against farmers were brought to court.

Solutions:

- **New regulations and EC grants** to encourage farmers to adopt new practices.

- **Inspections and fines** (200 farms inspected in 2 years = 60 warning letters & 15 cases went to court)

- **Suction dredging** in Broads and river to remove black necron nutrient rich sediment at the bottom Broads

- **Restocking river with 40,000 new fish** to maximise chances of recovery of stocks

- **Campaign to raise farmers' awareness** of the issues

- **Ferric Chloride solution** Experiments in Netherlands with ferric chloride solution - tests suggest this slows release of phosphates (this is cheaper than suction dredging)

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Problem 5 - excess nitrates from fertilisers

These come via surface run off across farmland. This has steadily increased since the 1940's. Experiments have shown that excess nitrates damage reedbed quality - nitrogen acts as extra fertiliser & the plants become tall, top heavy and have poor root development. They are then easily eroded as their roots are shallow. Harder to control & inspect than phosphate waste.

Solutions:

- **Education via leaflets** to farmers

- **Establishing "vulnerable zones"** which are inspected regularly

- **Joint research** by National Rivers Authority and Broads Authority.

- **Encouragement of crop rotations** as natural fertilising

- **Suction dredging** started in 1982 in Broads and rivers to remove black nutrient rich sediment at the bottom of Broads.