

MERSEY MATTERS

**Tidal energy and the
Mersey Estuary –
where do we stand?**

NEXT PAGE

The Mersey has been a lifeblood to industry for generations, but that same industry almost brought the estuary to the brink of ecological collapse. Those times are past, but now a new threat may emerge

Choose wisely

The Mersey is flowing in the right direction, we must make sure it stays that way

Stretching wide muddy arms out into the Irish Sea, the Mersey has been at the heart of life in the north west of England for centuries. The river has a history as turbulent as its churning waters, but after decades of improvements to this internationally important wildlife refuge, it now faces a new, perhaps even greater challenge.

In 2011, multi billion-pound plans to harness the estuary's tidal flow were put on hold, safeguarding – for now – populations of wading birds, ducks and fish that may have been severely impacted by proposals to build a tidal 'barrage'. What the proposals showed however, is that the future of the estuary as a potential resource for renewable

energy is by no means certain.

From tributaries meandering across the Cheshire countryside making their way to the Runcorn Bridge, to the industrial hubs of Liverpool and Ellesmere Port, the Mersey is an invaluable natural resource upon whose banks success and prosperity have been built.

These same banks and wide expanses of mud play host to other riches however, in the shape of tens of thousands of birds for whom the Mersey is just as much a home as those taking the ferry across the churning waters. Below the waves there are vitally important populations of fish and eels, but without the visual show of wheeling flocks of birds that we can all see, it's easy to forget this watery ecosystem that is so often out of sight.

The Mersey has a chequered history, and we have perhaps not always treated this gift from nature as well as we should. Those times have now passed, and the Mersey estuary of today is one of international significance for wildlife, and one where wild salmon once again leap through white water in the shadow of industry.

With the Government setting ambitious targets in the next decade for renewable energy, the appeal of exploiting the daily tides of the Mersey, and that of other UK estuaries is clear. However we must also understand and consider the full range of renewable energy options that the UK has to offer, and whether thorough, comprehensive environmental assessment will allow us to achieve viable energy generation alongside

thriving wildlife populations.

Renewable energy is good for the UK and our environment, but only when it is used at the right location, and when the impacts are fully understood. With climate change already presenting challenges to our landscape, we should first understand the value the Mersey in helping us adapt to a changing climate.

In recent years the focus of conservation

efforts have centred around the creation of 'landscape scale' projects that integrate all the elements of our countryside into self-sustaining habitats that provide not just for wildlife, but for the needs of our daily lives from water supplies to flood alleviation. Rivers and estuaries such as the Mersey are the arteries of our landscape and so are integral to this approach.

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In this report



What could happen to the Estuary? pp4-5



The estuary's water life, pp6-7



The estuary's birdlife, pp8-9



A changing climate, pp10-11



The proposed scheme, pp12-13

PREVIOUS PAGE

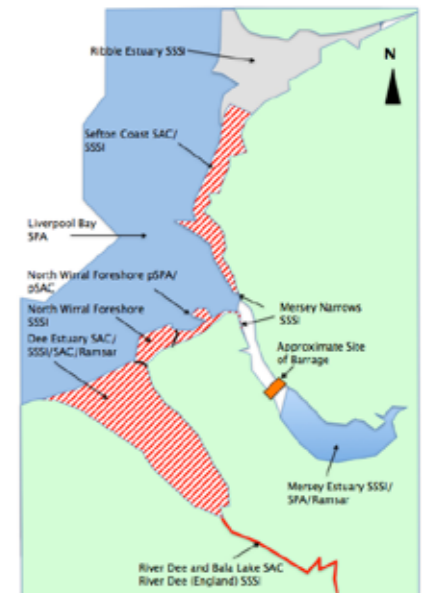
NEXT PAGE

Large parts of the Mersey Estuary and the adjacent coastline are protected by both European and UK wildlife legislation

What could happen to the Estuary?

Our estuaries and the potential power within their tidal flows makes them strong candidates for renewable energy – but at what cost?

Designated sites within and around the Mersey Estuary



SSSI: Site of Special Scientific Interest (UK)
SPA: Special Protection Area (EU)
SAC: Special Area of Conservation (EU)
P: Proposed designated site

The idea of harnessing the tidal power of the Mersey is not a new concept, but what could happen to the estuary if a barrage was built across it? One thing is certain

– It would not remain unchanged, but the detailed Environmental Impact Assessment to predict the extent of that change has not yet been carried out. Our principal concern is the likely fundamental and probably irreversible change to the daily dynamics of the flow of water and sediment in the estuary.

The Mersey Estuary is a high energy environment in which thousands of tonnes of silty sediment are swept in on each flood tide and out on the ebb. These sediments are the life

blood of the intertidal mud flats on which the birds feed, and contain the essential nutrients needed by the invertebrate communities that live in the mud, so any interference to sediment movement is cause for concern.

A barrage generates electricity by creating an artificial structure across the estuary which holds back the high tide and then releases the stored water, usually on the ebb tide, through turbines when water levels downstream of the barrage have dropped. This holding up of the tide means that the precious mud flats are less available to the birds that feed on them, because they are covered with water for a longer period. Unless special measures are taken, some areas of mud flat may become

permanently covered. Added to this, changes in the tidal flow may also affect estuary fringe habitats such as saltmarshes and rocky shores, crucial for feeding and roosting by other species.

There are several other changes that could occur. In estuaries elsewhere in the world where barrages have been built, such as the Eastern Schelde in Holland and Annapolis Royal in Canada, the mud flats upstream of the barrage have been gradually eroded, so that the area of feeding ground has reduced irrespective of its availability to birds.

There are other potential impacts that are more specific to the Mersey. 100 years of industrial pollution have left their mark on the

estuary sediments in the form of increased levels of toxic metals such as Mercury and persistent organic chemicals such as polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs).

If the barrage resulted in redistribution of some of these historic contaminated sediments then the contaminants could get back into the food chain. Alternatively, if the mud flats became less muddy and more sandy, then the total amount of food available would probably reduce, and change in nature, with impacts on birds that would be difficult to predict

An additional and often un-seen challenge presented by tidal generation is the impact on fish. Indeed, it is possible that by

accommodating the needs of bird species above the water, the resulting effects on fish could be increased to an unacceptable level below. At the heart of this problem is the repeated passage of fish – including migratory species such as eel and salmon – through the turbine structures. Much of the thinking around how to minimise this impact on fish currently remains untested.

We do not know how far away these changes would be felt, but there is certainly concern that they could extend to coastal areas such as the Wirral outside the main estuary. It is therefore critical that the environmental studies acknowledge the interaction between the inner estuary feeding areas and adjacent

coastal areas.

In such a complex and dynamic habitat, it is important to understand the needs of all the species relying on the estuary, both individually and collectively. It is also key that the role of the estuary as an un-frozen water body in extreme winter conditions is not underestimated.

It is the job of both the Government and those developing tidal generation proposals to balance our energy needs against the estuary's intricate ecological value, especially when such projects may have a lifespan of over a century, after which any attempt to reinstate the estuary's original state would be an unprecedented conservation challenge.

Atlantic salmon hatch in clear, clean gravel beds upstream before travelling downriver to the ocean to feed and grow. Two or three years later, they'll return to breed in the same place

Salmon have only been back in Mersey since 1999. Forcing them to swim through fast-moving turbines could have a devastating effect on this revived population

An underwater icon returns

It's not just salmon. Eel, shad, lamprey and sea trout must all move between fresh and salt water to survive

That most iconic of British fish - the salmon, is back in the Mersey. Two centuries ago the Mersey was renowned as one of the most productive estuaries in Europe. Every year, thousands of salmon made their tireless pilgrimage to spawn, and cockles and mussels were abundant. It was only the ravages of the industrial revolution and its associated rapid increase in population that led to the decline in water quality. For the next 100 years or so the estuary became perhaps the most polluted in Europe, devoid of life-giving dissolved oxygen much of the time and contaminated

with toxic chemicals, little better than an open sewer. As Michael Heseltine famously said in 1983: "Today, the River (Mersey) is an affront to the standards a civilised society should expect from its environment".

After decades of slow improvement in water quality, a little over 10 years ago salmon finally returned to the estuary. Initially running up the River Bollin, miraculously finding their way along the Manchester Ship Canal and finally into the headwaters of the Goyt in the Peak District to spawn. The number of returning salmon have increased year on year since that date

and have become a symbol of an estuary that has finally recovered from its horrendous past.

Sadly, a barrage could be serious threat to this newly revived population. Each year adult salmon return to the estuary and swim through it to reach their spawning grounds. The barrage would represent a serious obstacle to returning salmon in the estuary, even with a 'fish pass', as they are drawn to the fastest flowing water, that which is inevitably found coming through the turbines. Attempts by fish to swim through the turbines would almost certainly result in death or serious damage. If they did get

through to spawn, then the smolts (young salmon) migrating downstream on their way to the sea would also have to run the gauntlet of the turbines within the barrage before they reached the sea.

However, it is not only salmon that may be affected. Sea trout, eels and lamprey must all move between salt and fresh water to survive, and other rarer species such as twaite shad are found in neighbouring estuaries and will hopefully return to the Mersey in time. The estuary is also an important nursery area for sea fish such as bass, and the effect of the barrage on them will also need to be closely examined.

For young salmon in the headwaters of the Goyt, a hard journey is ahead



FLPA/Photo Natura Stock

Lindsay McAfee

PREVIOUS PAGE

NEXT PAGE



For thousands of dunlin the mud of the Mersey is worth flying vast distances for (inset) The fringe habitats and sandbanks on the estuary are vital for shelducks' flightless moulting period.

On a wing and a prayer

They arrive by the thousand, from Canada, Africa and Russia. And they come to the Estuary for food, rest and shelter

The Mersey estuary is a refuge for tens of thousands of birds every year, many having travelled from the arctic circle to come to its shores

However hard we try, on a long journey most of us will need to grab something to eat to see us through those last few miles.

But what if that journey was thousands of miles, and that quick stop-off for food made the difference between life and death? For tens of thousands of migratory birds each year, the Mersey estuary really is that important.

When you're flying half way across the northern hemisphere from the arctic circle to southern Europe and beyond – perhaps losing half your body weight in the process, the invertebrate rich mud of the Mersey is a lifesaver.

A dunlin may lose half its bodyweight on migration, so the mud of the Mersey is a lifesaver

Every autumn, tens of thousands of waterbirds arrive on the Mersey Estuary from their breeding grounds across Northern Europe, Canada and Siberia. Some of the birds only spend a few days there to refuel en route to migratory sites further south, while

others spend the entire winter on the Mersey.

Birds choose the estuary as it offers shelter from the elements and an abundance of food. It has been calculated that the worms, shrimps and shellfish found underneath one square metre of Mersey mud have the same number of calories as 16 Mars bars. No wonder they are willing to fly so far to feed there.

Almost 70,000 birds can be found on the estuary during the winter months and, as a result, it is an internationally legally protected site for waterbirds.

The most abundant species on the Mersey are dunlins, a small wading bird, which travel thousands of miles from their breeding grounds in Russia and Scandinavia each autumn to the estuary. Here, they share the mud with other wading birds such as black-tailed godwits and redshanks, escaping the chill of Iceland.

Also lured by the natural charms of the Mersey are shelducks, which gather in late summer to shed their plumage and grow a new set of feathers. During this time they are completely flightless and depend on the

Mersey's undisturbed mudflats and saltmarshes for their survival.

As well as an extremely valuable wildlife site in its own right, The Mersey also forms part of the world's second most important wetlands network for migratory birds. Collectively, Morecambe Bay, and the Mersey, Ribble and Dee estuaries host around a million waterbirds every year.

With so many birds reliant on this part of the UK, protecting the natural environment of the Mersey and the other estuaries in the North West is vital.

Starlings roosting at sunset, Runcorn Bridge

A challenging climate

The Mersey is back from the brink, we have a duty to keep it that way

We find ourselves living in an increasingly challenging climate – in every sense of the word. Now, more than ever, we are increasingly aware of the impact that our day-to-day lives have on the environment, and the potential consequences of not giving this impact the consideration it deserves for the future prospects of our children and grandchildren.

We are at the forefront of a power-hungry generation, but at the same time we are prepared to stand up and fight when our public spaces for nature are under threat, and we see our seas and coasts at risk. Somewhere in between these conflicts a balance must be drawn.

We are fortunate in the UK that our

renewable energy resources can be rich and abundant, such as wave, wind and tidal power and the desire to exploit these for sustainable long-term energy generation is strong.

The north west and the Mersey estuary in particular, provides an exciting and tempting opportunity to meet a large slice of the region's and the UK's energy needs. It's also easy to see such a multi-billion pound project as highly attractive when we find ourselves in a tough period for employment and investment.

It is critical however, that we ensure that the very highest EU and international designations for our most precious wildlife and habitats are not undermined, and the purpose of their existence is not simply disregarded in the name of progress.

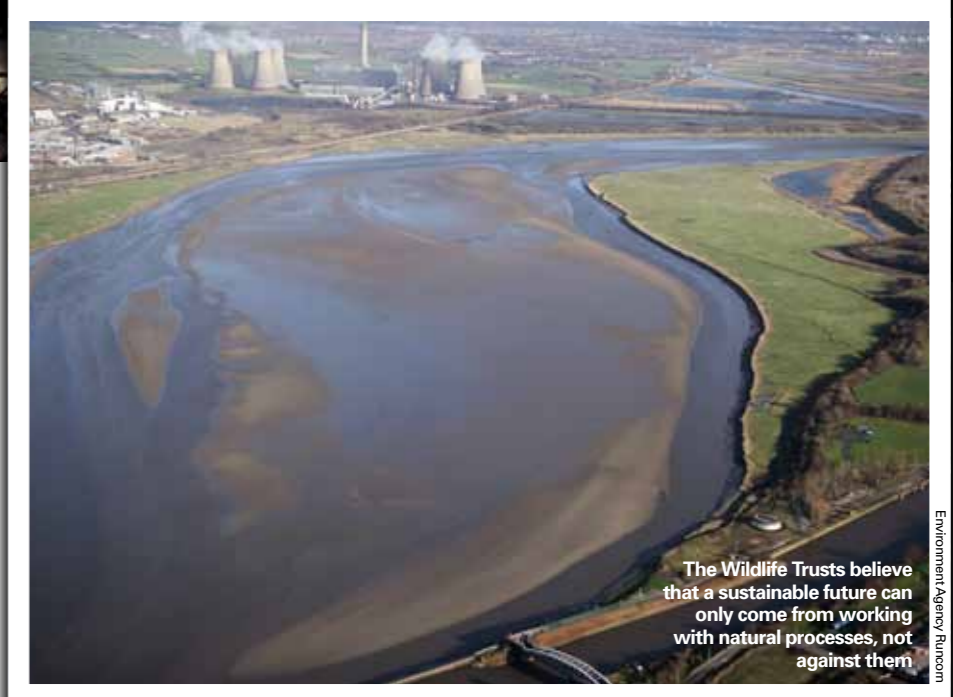
The Mersey is a crucial wild place that is finally on the verge of recovery, after generations of damage for which we must be held responsible. Surely we have a duty not to undo this hard work.

It is self-defeating to view our energy needs in isolation from our natural environment

Whilst we have the chance to give ourselves a sustainable, renewable power source with one hand, we must not take away with the other the very biodiversity and quality of life we are aiming to protect by battling climate change.

Any future development of the Mersey estuary has the opportunity to set a precedent. Not of an irreversibly damaging century-long legacy, but a project that through the use of ground-breaking technologies and the expertise of industry and science can be a world-leading demonstration of how the wildlife and renewable energy generation can exist in harmony.

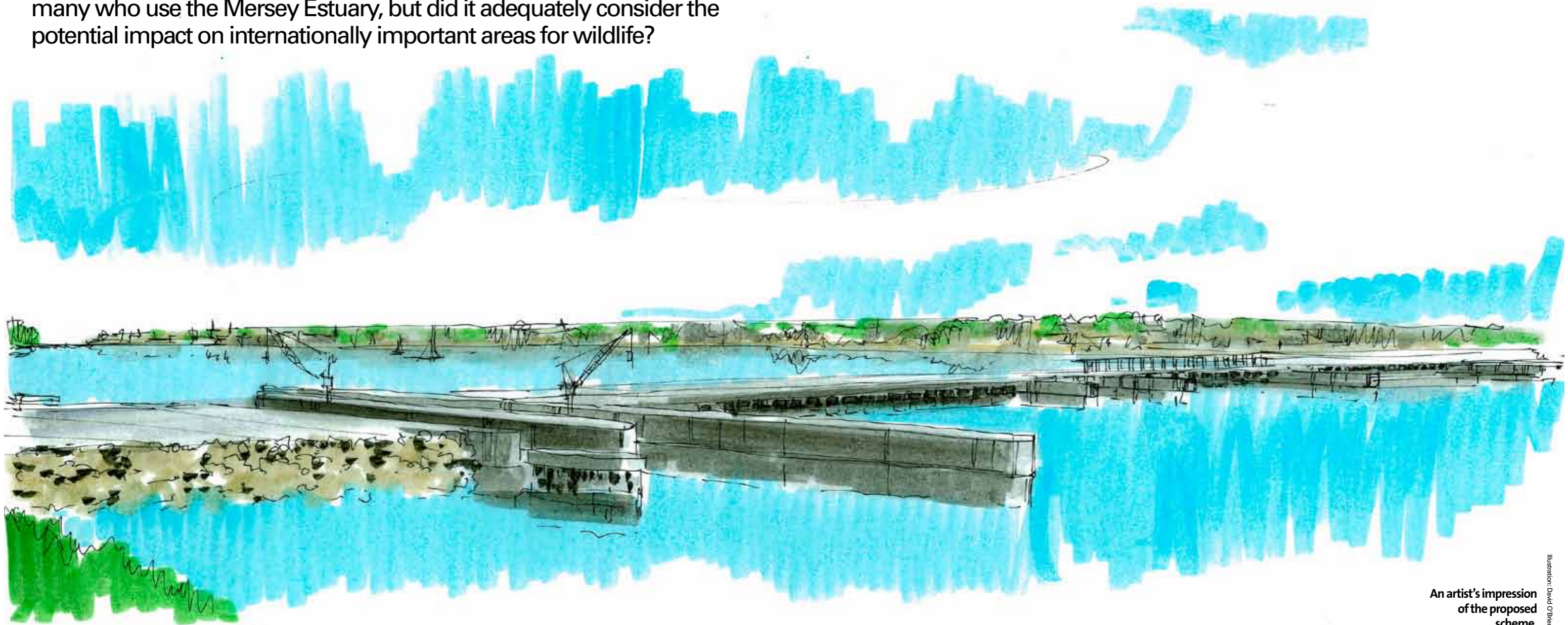
Whatever we choose to do, we must be sure that our moral and ethical decisions are not ones that we may live to regret in years to come.



The Wildlife Trusts believe that a sustainable future can only come from working with natural processes, not against them

The Proposed Scheme

The tidal energy scheme proposed in 2011 addressed the needs of many who use the Mersey Estuary, but did it adequately consider the potential impact on internationally important areas for wildlife?



An artist's impression of the proposed scheme.

Illustration: David O'Brien

The final preferred scheme put forward by the developers (Peel Energy) in 2011 was a barrage across the river Mersey between New Ferry (Wirral) and Dingle (Liverpool). The North West Wildlife Trusts do not believe they could support this scheme as it has been proposed.

The scheme would generate some 920Gwh per annum and would be designed so that the 28 turbines within the barrage would generate power in two ways – from ebb tides only as well as from ebb and flood tides – and from a

range of water level differences (operating heads) across the barrage.

This choice of scheme, whilst allowing flexible operations that were intended to reduce the effects on the Mersey's protected intertidal habitats, would if anything increase the impact on migratory fish such as eels and of course salmon. However, a formal Environmental Impact Assessment, which would also involve detailed sediment transport modelling, has not been undertaken, so it has not been possible to pursue these concerns.

Multiple navigation locks would need to be

included to accommodate large commercial ships and small leisure craft, so that they could get through to the Manchester Ship Canal. These locks added substantially to the capital cost of the scheme.

The scheme has been shelved for the present (June 2011) as studies have found that the estimated £3.5 billion upfront construction costs result in a cost of electricity that is not competitive in the current energy and capital markets. However, if circumstances change, for example if there is a change in government policy that favours tidal energy, then things

could look very different.

The North West Wildlife Trusts worked closely with the developers of the proposed scheme, Peel Energy, during the planning stages. Detailed and thorough reports outlining the rationale for selection of the

options, together with preliminary assessment of their environmental impacts and efforts to mitigate those impacts, were produced by Peel Energy and commented on by the Trusts and other interested parties.

The Wildlife Trusts made formal responses

to the proposals articulating our concerns and expressing the hope that further research could be done, so that if the scheme is ever resurrected we will have better information on which to base an assessment. However, to our knowledge, no further work is being carried out.

In the meanwhile, the Trusts will continue to maintain a watching brief on this historic estuary and on any development proposals that might impact on its valuable wildlife.

Below in an artists impression of the proposed scheme.

The North West Wildlife Trusts do not believe they can support the scheme as it has been proposed

NEXT PAGE

Your local Wildlife Trust

Your local North West Wildlife Trust is working hard to protect habitats and species in your community and standing up for wildlife where you live – including energy and development projects that affect all our futures.

You can make a difference today by becoming a member and supporting the Wildlife Trusts in their campaigns in the North West and throughout the UK.

How to contact your local Wildlife Trust



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