



---

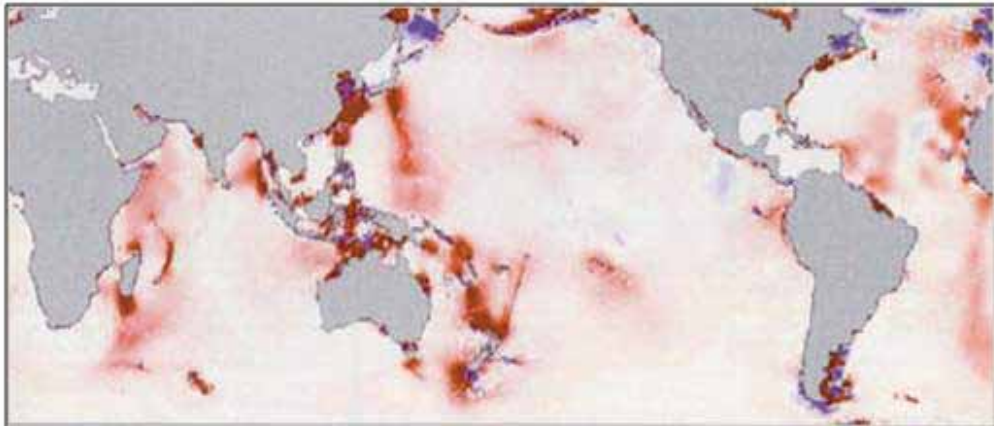
The Business of  
**Marine Energy**

---

Oceania Room | Te Papa Tongarewa | Wellington

# Crest Energy Kaipara project

March 2011



World tidal hotspots





## World's largest tidal power scheme planned for Kaipara

WED, 09 FEB 2011 6:22P.M.

By Adam Ray

The environment court has approved plans for a giant underwater power plant on the seabed of the Kaipara Harbour, north of Auckland.

The plan is for up to 200 turbines being driven by tidal flow and producing enough power to run every home in Northland.



### Northland hapu may fight turbine approval

Updated at 5:46pm on 10 February 2011

**A Maori hapu from Northland is considering appealing against an Environment Court decision which clears the way for 200 underwater turbines to be built in Kaipara Harbour.**

Crest Energy wants to build a 200-megawatt station, the world's largest tidal power scheme to provide electricity to all homes and businesses north of Albany in Auckland.

Te Uri o Hau, the kaitiaki (guardians) of Kaipara Harbour, say it is home to New Zealand's largest estuarine ecosystem and they are concerned about the

# nzherald.co.nz

## Tidal power station for Kaipara approved

By Wayne Thompson

5:30 AM Tuesday Feb 8, 2011

Share 347

More than half a billion dollars will be spent on sinking tidal power turbines to the seabed of the Kaipara Harbour after the approval of New Zealand's first tide-driven power station.

But the Environment Court has set conditions of consent for the



+ EXPAND

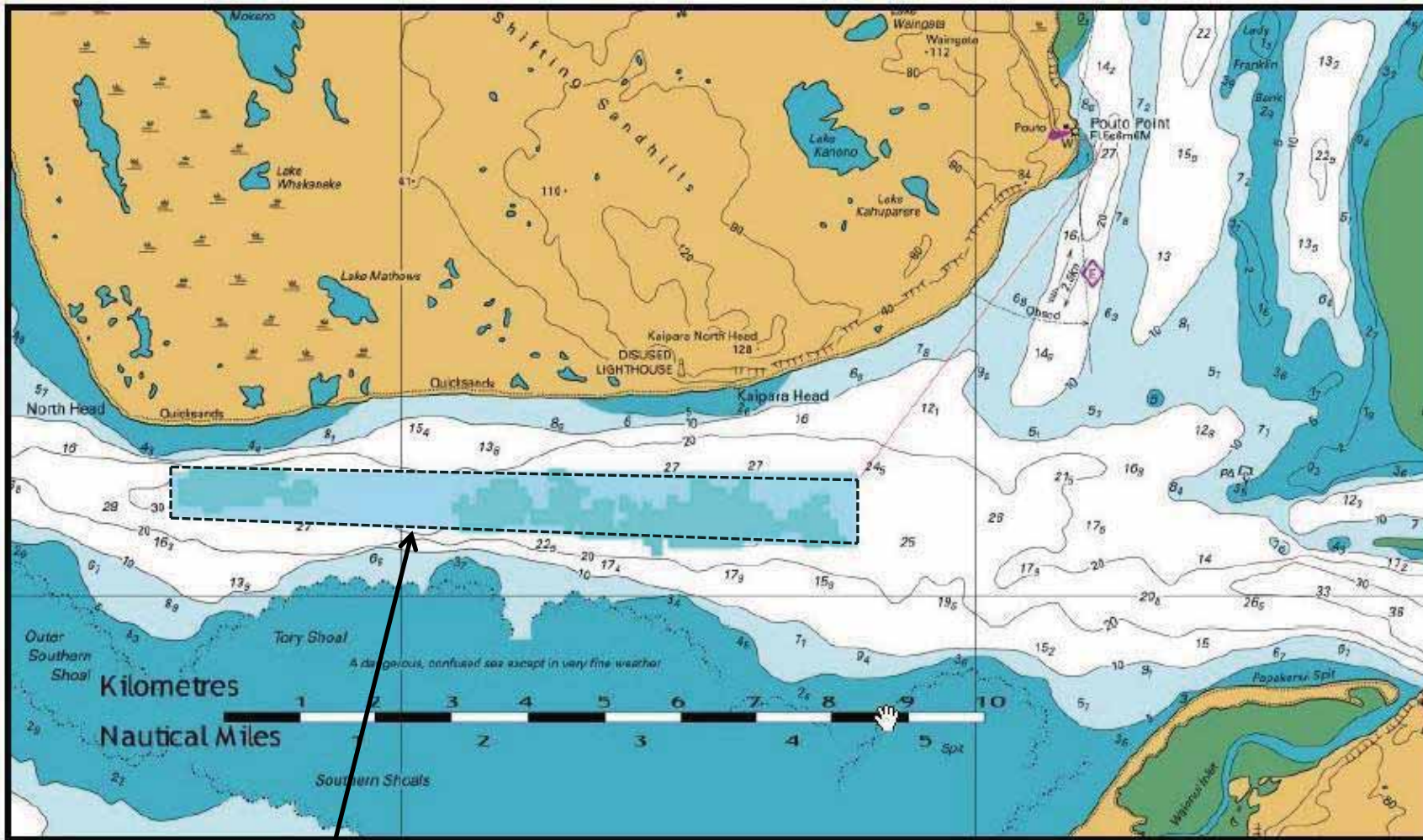
# History

FSA	Foreshore and Seabed Act 2004
TuoH	Te Uri O Hau
Environs	Environs Holdings Ltd, a TuoH Settlement Trust company

2005	Jul	Company incorporated in NZ
2006	Jul	First applications to multiple authorities (AEE=Assessment of Environmental Effects documents)
	Aug	First s92's from NRC (Northern Regional Council)
2007	Jul	Revised AEE
	Nov	Second s92's
	Dec	Third s92's
2008	May	NZ Marine Energy Deployment Fund NZ\$1.85 million awarded by Energy Minister
	May	NRC Hearings ended Whangarei
	Aug	NRC recommend in favour of Crest project
	Sep	Appeals against consents being granted
		Ministry for the Environment awards Environs \$37,500 from Environmental Legal Assistance Fund
		Dept of Justice assist TuoH in s33 FSA 'territorial customary rights' applications
	Nov	Election, FSA changes proposed
2009	May	Environs High Court stay application to stop Environment Court process
	Jun	High Court application denied
		Environment Court hearing Whangarei two weeks
	Jul	Todd Energy Ltd becomes cornerstone shareholder
	Oct	Claim against Crown under 2002 TuoH Settlement Act that the Crown has neglected its treaty obligations by allowing EECA Crest \$1.85 million grant and NRC decision in favour of Crest
	Dec	Environment Court Interim Decision in favour (and RMA amendments but not retrospective)
2010	Jan	Crown treaty negotiator wants Crest 'in the loop' with regard to Kaipara FSA discussions
	Mar	Chris Finlayson, Attorney-General, Minister for Treaty of Waitangi Negotiations releases FSA options
	Apr	FSA series of hui and public meetings for Finlayson, Maori Affairs committee discussions
2011	Feb	Environment Court recommendation in favour
	Mar	Minister of Conservation approval granted

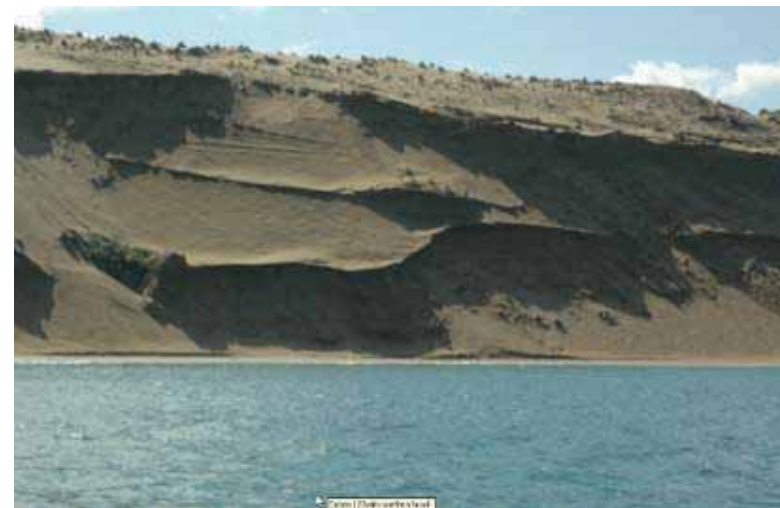
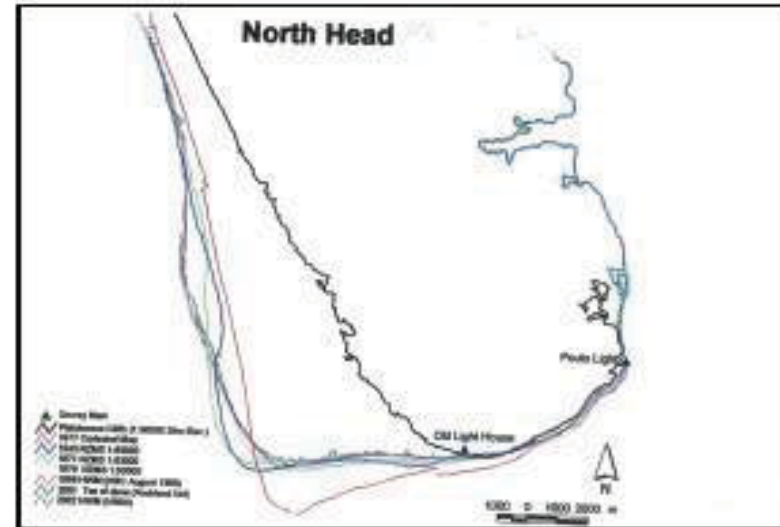


# The Kaipara



Permit area about 8 km x 1 km, 35 year term with 10 year 'lapse'

# Changes— long term



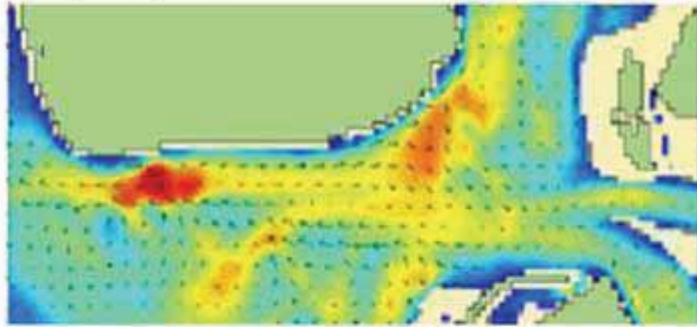


# Changes – short term & navigation

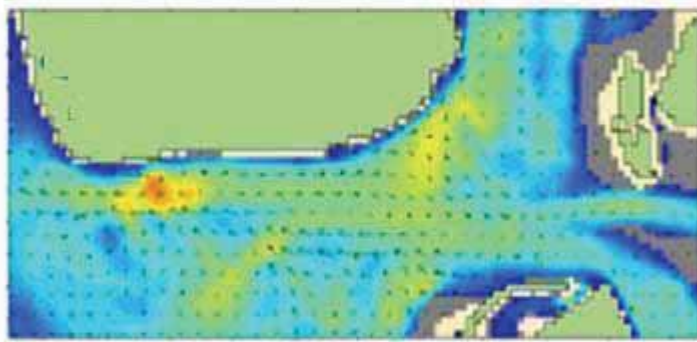


# Modelling (1)

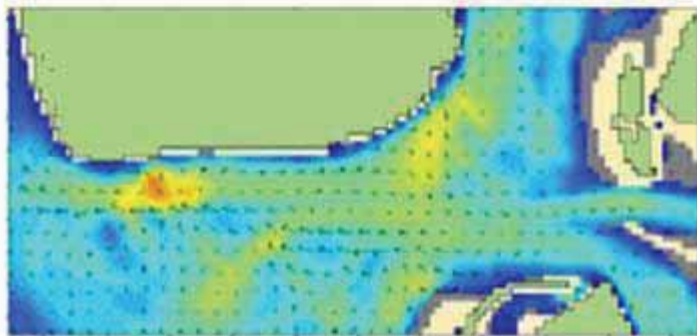
Spring tide



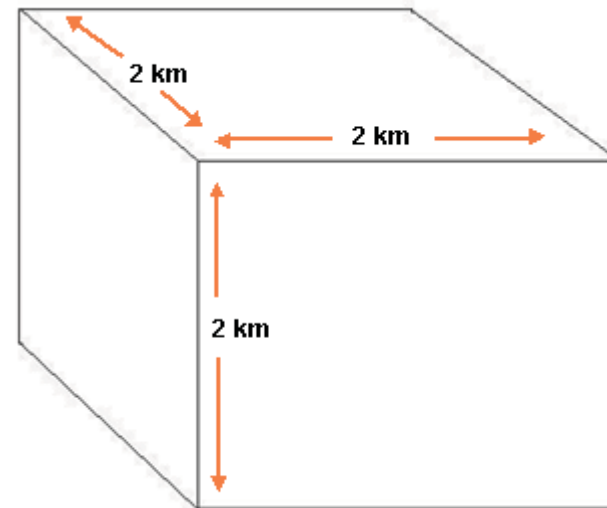
Mid tide



Neap tide

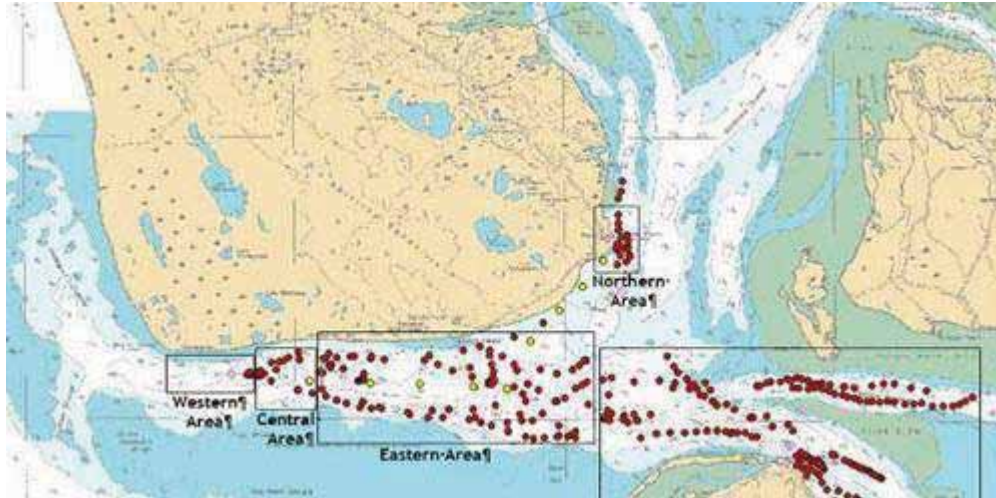


Each day about 8 cubic kilometres of water flows in and out of the harbour





# Harbour floor



# Electromagnetic fields



# Snapper



## The Northern Advocate

Home Local News Local Sport Property

### Kaipara is a giant snapper nursery: Experts

Mike Dinsdale | 4th March 2009

 [Email Story](#)  [Print](#)  [Aa](#) [la](#)

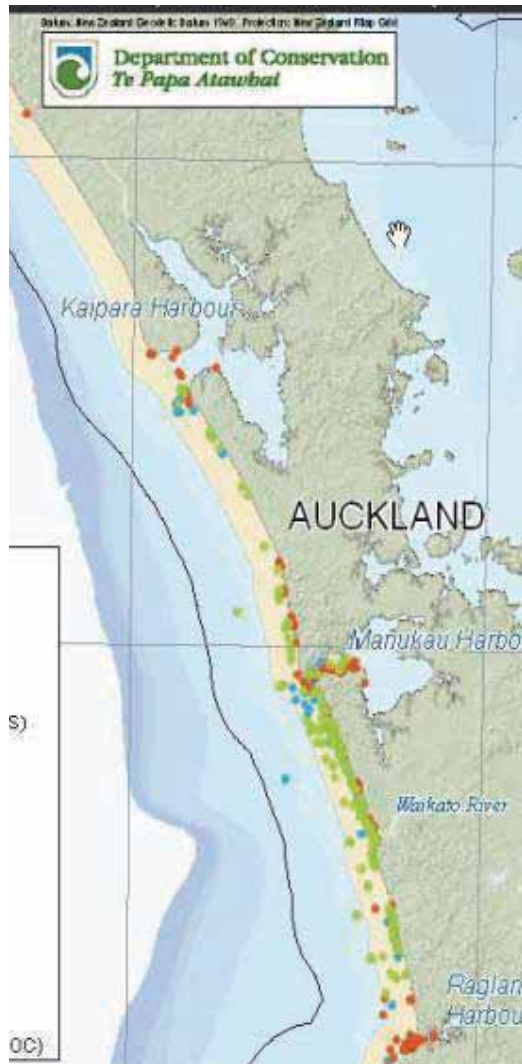
Northlanders know the Kaipara Harbour is a great place to fish for snapper, but scientists have now confirmed why.

Ninety eight per cent of all snapper off the west coast of the North Island come from nurseries in the harbour. Scientists say their research shows how important it is to protect the Kaipara Harbour

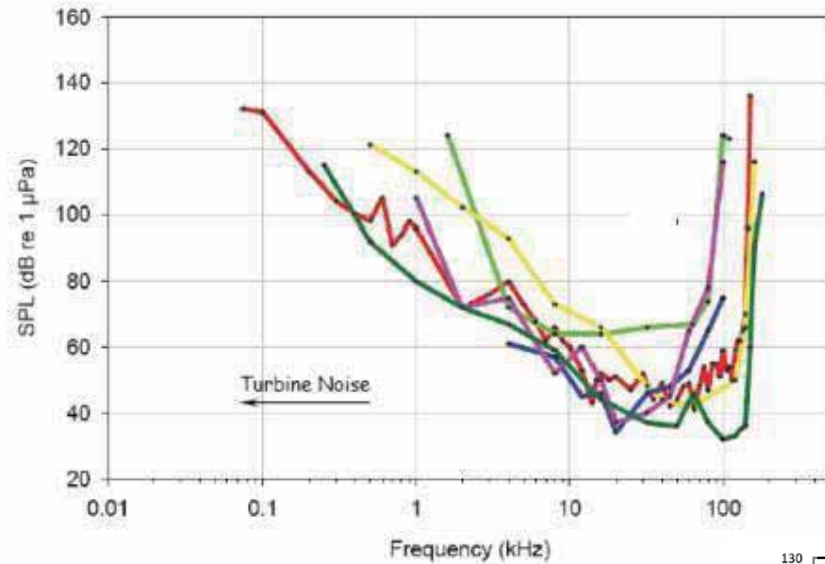




# Marine mammals



# Fish, marine mammals, elasmobranchs - noise



- Bottlenose dolphin (Johnson 1967)
- Risso's dolphin (Nachtigall et al. 1995)
- Striped dolphin (Kastelein et al. 2003)
- Killer whale (Szymanski et al. 1999; Behaviour)
- Killer whale (Szymanski et al. 1999; ABR)
- Harbour porpoise (Kastelein et al. 2002)

Distance	Predicted Noise (re 1 µPa)	Level above Ambient
20m	156dB	35dB
50m	149dB	28dB
100m	143dB	22dB
200m	137dB	16dB
400m	132dB	11dB
600m	128dB	7dB
800m	126dB	5dB
1000m	124dB	3dB
1500m	121dB	0dB

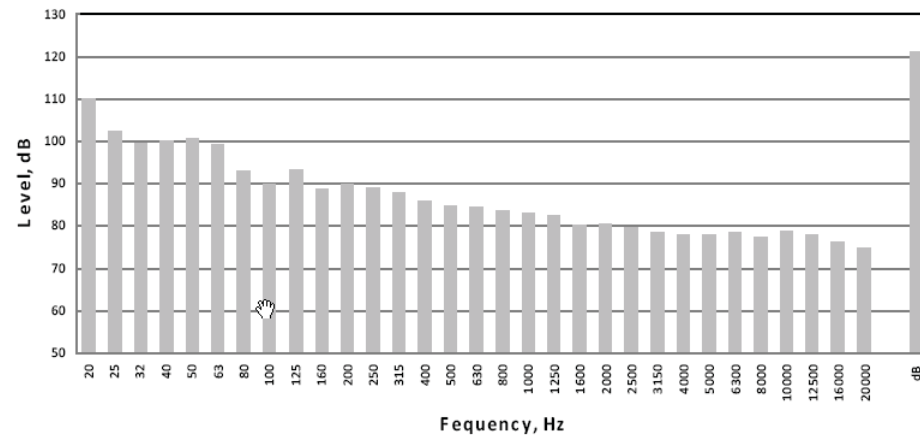
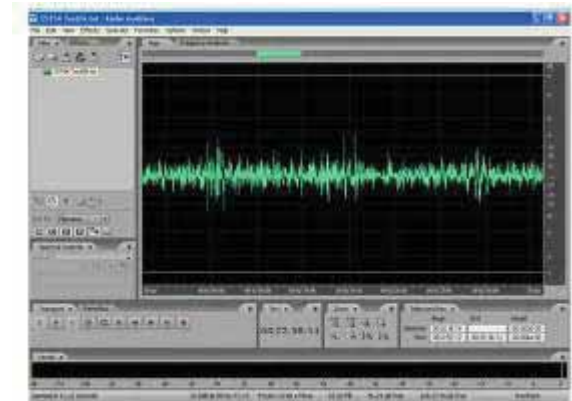


Figure 2. Measured Background Sound, Site 2 at 20m

# Timeline

- Two years pre-construction monitoring of the environment as a baseline for future comparison of effects (about NZ\$ 1 million)
- Five stages for 3, 20, 40, 80 and 200 turbines
- First stage \$18-\$25 million
- Total costs over ten years about \$600 million (65% capex, 35% operating costs)



# Technology options



New (and well-capitalised) participants include:

- Atlantis Resources + Morgan Stanley
- Voith Hydro + Siemens
- Andritz Hydro + Hammerfest Strom
- Openhydro + Nova Scotia Power
- Rolls Royce



# Milestones

- July 2006 - Consents Lodged
- Aug-Sept 2006 NRC recommends in favour of Crest; appeals to EC
- Dec 2009 Interim Environment Court decision in favour of Crest (detailed EC minute identifying concerns, issues to be worked upon including effects on fisheries, marine mammals and content of Environmental Monitoring Plan)
- During 2010, work on adaptive management regime, consent conditions, draft EMP and further evidence; extensive consultation. EC- sponsored mediation of 13 unresolved issues.
- March 2011 – EC determines outstanding issues; consents granted by Court and Minister of Conservation; 100+ conditions

# Significant Points Made by Environment Court

- Applicant should not be put in position of having to carry out all necessary research before making application or before a Court Hearing
- EC had strong desire to see a robust adaptive management regime put in place (onus on applicant to persuade the Court as to merits of proposals)
- Noted that Crest had responded positively to direction given in Interim Decision
- Noted conditions of consent and draft EMP had “come a tremendous distance” since the first drafts reviewed by the Court
- Crest has come to the point of offering careful and conservative conditions
- A 35 year term is warranted due to the project’s contribution to power generation, the national economic interest, and need for security of investment



## Consents Cover (in summary) :

- Minister of Conservation:
  - occupation of CMA (turbine arrays)
  - disturbance of foreshore and seabed
- Northland Regional Council:
  - installation of turbines, extraction of energy
  - placement, use, occupation (2x 7km electricity transmission cables)
  - disturbance of seabed during displacement
  - miscellaneous discharges

# Key Consent Conditions

- Implementation of an extensive Environmental Monitoring Plan EMP (the details of which were approved by the EC as part of consenting process).
- Implementation of a Baseline Monitoring Programme (part of EMP), including Pilot Survey, for minimum of 2 years before installation of first turbine
- Staging of Deployment of turbines
  - Stage 1 (stage 1a max 3, max 20)
  - Stage 2 (max 40)
  - Stage 3 (max 80)
  - Stage 4 (max 200)
- Installment of stages to be based on Adaptive Management, involving:
  - Ongoing monitoring / assessment of effects
  - Mandatory inter-stage s128 reviews by NRC (fully notified)
  - Adaptive measures as appropriate (see below)

## Key Consent Conditions (continued)

- Before proceeding with Stage 1a, satisfy NRC that very probable that effects on cetaceans, fish, elasmobranchs and NIWC commercial fishery will be “less than minor”
- Before proceeding with each subsequent stage, satisfy NRC that very probable that effects on above will be “no more than minor” ( that is, NRC has to approve each stage prior to deployment)
- If more than minor adverse effects identified in a s128 review (above), Crest is to adapt its activities *to the extent necessary* to avoid such effects
- Adaption to include *as necessary*:
  - (a) removal of some or all of the deployed turbines
  - (b) not implementing subsequent stages in whole or in part (*Augier* conditions)

## Key Consent Conditions (continued)

- Preparation of an Operations & Management Plan (in consultation with Te Uri o Hau and DOC)
- Preparation of a Bio-security Plan (same consultation as above)
- Extensive Reporting Requirements to NRC (reports to be peer-reviewed)
- Establishment and funding of a Kaipara Harbour Environmental Trust (minimum funding of \$100,000/ annum to end of Stage 1; thereafter \$250,000/ annum for balance of term of consent)
- Bond to cover decommissioning costs. Initial bond of \$3.1 million, increasing thereafter in accord with NRC determination.





---

The Business of  
**Marine Energy**

---

Oceania Room | Te Papa Tongarewa | Wellington