

An Atlas of small voyages

LAND, a sure footing, a Terra Firma, our groundedness. But my story is somewhat different, nomadic and fluid. Like Odysseus, who, after all that hard travel and the spat with the suitors, was told to shoulder a ship's oar and walk inland until he found a place where no-one could recognise the oar – at last he was becalmed and landlocked, finally at anchor.

Here, the navigational directions, a *Rutter*¹ to my Ultima Thule, as a small atlas of aqueous morphologies. In these narratives, land is always in sight, within earshot; it can be sensed on the breeze, appearing as a haze above the meniscus of the horizon, glimpsed sliding under the keel during landfall at a temporary safe haven.



Toll installed as part of the Innenseit project during Documenta10, Kassel
Photo Credit ~ The Artist

*And God said, Let the waters vnder the
heauen be gathered together vnto one place
and let the dry land appeare: and it was so.*

*And God called the drie land, Earth, and the
gathering together of the waters called hee,
Seas: and God saw that it was good.*

Genesis, 1611 King James Bible.

Cushioned in a sac of amniotic fluid the foetus rehearses evolution, the proto-gills and proto-tail a reprise of all cordate development. Much detested by the creationists, Re-capitulation Theory was first conceptualised in the seventh century BCE, not in biological but in linguistic terms when the Egyptian Pharaoh *Psamtik*² experimented with young children to discover the origins of language, raising them without conversation to determine their first pure utterances (supposedly the Ur-tongue).

Somewhere deep in the primitive reptilian part of our brain stem we hold mnemonic traces of our original Mezozoic environment – *Pangea*² the vast swampy island continent surrounded by a warm global sea, long before the single landmass broke up into separate continents. Somewhere between then and now.....

An Atlas and Rutter.

Saltmarsh ~ *Toll*

River ~ *Vox Aura*

Archipelago ~ *CrayVox*

Island ~ *Run Silent Run Deep*

Lake ~ *Weeping Willow*

Ice shelf ~ *Bio_Logging and Under the IceCap*

Inundation ~ *Deluge*

1. Saltmarsh ~ Toll

My point of departure is a compact of folk-tales told about one of the Sussex villages⁴ where I spent much of my childhood. The narrative concerns a virtual bell which has become emblematic for me – in as much as I consider all sound to be simultaneously *real* and *virtual*, simultaneously a phenomena and a sign.

The helmsman sweeps the steering oar across the ship's stern. The bow describes a slow arc bringing the village squarely into the wooden gaze of the dragon's head. The hull glides between the dwarf oaks that line the salt marsh and the crew trim the sail for landfall. At one nautical mile from shore the gaze of the figurehead is acknowledged by a clamour of bells, sounding the alarm from the octagonal tower of the church. This is all that is happening today, a fierce prow staring at ringing bells. Beyond, dark silent forests stretch over the coastal hills to nowhere.

Bell, Bellum, Below, English resounds with memories of havoc. Every bell-rope straining in chaotic peal, every inhabitant scrambling for the protection of the underground crypt, hollowed out in the sixth century by Irish Monks. But out on the marsh the Norse leader is hearing something new – a sweet harmony singing above the normal tones of the church tower – he will have this phantom bell as his prize⁵.

This southern littoral is poor pickings, the raiders work it every four years, leaving sufficient on each occasion to allow the peasants to reestablish their livelihood. Normally the church is passed by, acknowledged as a refuge in this cycle of brutality but this time the Norse storm the tower to take the new, sweet singing bell.

They manhandle it out of the belfry, hauling it across the water meadow and down to the hard-

standing where the ship is beached. They heave its mass over the gunwhale and secure it amidships behind the spruce mast.

When havoc subsides, the crew returns, with pigs, sheep and chattels in tow; the ship is cast off and the prow shouldered from the hard. The oars are unshipped and the vessel turned into the southwesterly breeze blowing from the channel. Quietly now, the long-ship eases away from shore into deep water, the commander gazing happily at his bronze prize.

But as the vessel reaches the dwarf oak forest, the captive bell sounds out a single tone and melts through the hull of the ship – they say that the raiders never visited again.

Many years later the villagers attempted to retrieve the bell, from its resting place – the *Bell Hole*. They employed a white witch who insisted on working with a team of pure white oxen, hauling a snow-white hair rope. The bell was located by a diver, the rope attached and the bell mostly surfaced before the rope snapped, revealing a single strand of black hair⁶ in its weave. The bell remains in its bell hole to this day.

Two hundred years after the Norse raiders first listened to the harmonics of this virtual bell, King Knut laid his eight-year old daughter to rest in the crypt that had sheltered the villagers. He was ruler over the short-lived Northern Empire – and regarded by his chiefs as omnipotent.

Knut, a pragmatist, found this acclaim to be irksome and so arranged a spectacle for his chiefs to demonstrate his fallibility. Setting a wooden throne on the hardstanding so frequently scored by Norse keels, Knut calmly sat eying the flooding tide, commanding it, in full earnestness, to ebb. The brackish waters however would have none of it and so Knut was eventually obliged to wade from his throne. Knut reestablished his position within the hierarchy of nature, as a mere King of men. Knut's Empire was to survive for some eighty years on Northern Europe's icy fringes.

The sound installation *Toll?*⁷ develops the idea that sound is simultaneously real and virtual. In the installation a matrix of sixty-four primitive Leyden Jars, with anodes and cathodes formed from Zinc and Copper bells create power to excite small resonators attached to a large church bell suspended in the bunker, which hums imperceptibly with a virtual sound memory.

¹ Rutter, a guide that leads the way through an unknown course, a navigational guide carried on Medieval ships before marine charts were commonly available.

² Herodotus mentions in his *Histories* (Vol 2) an experiment conducted on two children by Psamtik, who reputedly gave two newborn children to a shepherd who was charged with raising them without speaking to them. The shepherd was to listen to their first utterances in an attempt to discern the root of language. According to Herodotus one of the children uttered the word *bekos* which the Shepherd interpreted as the Phrygian word for bread, thus forming the conclusion that Phrygian was the original language of men.

2. River ~ Vox Aura; the River is Singing⁵



Vox Aura four channel sound work installed in the River Aura, Turku, Finland as part of European Capital of Culture 2011

Our blood has the same salinity as the Ocean – a reminder of the origin of all life on the planet, and a warning that we share our well-being with our vast and indifferent mother.

As terrestrial dwellers, it is easy to overlook the fact that we inhabit an essentially two dimensional space which has surface area but scant depth.

By contrast the marine world is three-dimensional, its depths accounting for 99% of the biosphere and its surface accounting for 70% of the planet's area. The ocean forms the principal interface of chemical exchange with the atmosphere, absorbing carbon dioxide and releasing oxygen - it is the pump that drives the climate and regulates the air we breathe.

Like other semi-enclosed bodies of water, the Baltic is brackish, its waters less saline than our tears. The River Aura flows through the port city of Turku, past the maze of low granite islands that form the Finnish archipelago and into the Baltic, carrying with it a mixture of chemical nutrients and effluents that simultaneously drive the annual algal bloom and degrade the complexity and fecundity of marine ecosystems. Simply put, the Baltic has lost its clarity and its fish but has gained the reputation as the most polluted sea in the world.

Vox Aura; the River is Singing suggests that we pay attention to these complex issues that ultimately control our destiny, by listening to the chemical composition of the Baltic whilst we also listen to our own stories and histories.

⁵ Pangaea, Pan = entire and Gaia = Earth coined in 1927 during a symposium discussion of Alfred Wegener's theory of continental drift and his concept of the *UrKontinent*.

⁴ Bosham, West Sussex – a village in Chichester harbour, elements of this narrative appear in the *Anglo-Saxon Chronicles*.

⁵ The narrative presumes the tone to be an harmonic artifact

74 ⁶ A Devil's tail, or Rogue's Yarn as it is known in rope-making.

The project consists of two vessels, moored on each side of Turku's Theatre Bridge, equipped with speakers which broadcast a soundscape. The first of these plays material from a large archive of sound recordings which evoke the maritime traditions and the marine environment of the Baltic; the second transforms this material, allowing us to listen to water quality data that is constantly collected by two trans-Baltic ships and downloaded to the work.

The project's computer system takes variables from this data, such as position, depth, temperature, salinity, turbidity and pH, using them as musical parameters to transform the source audio (which is playing simultaneously from the first vessel) producing an ethereal *datamusic* as a metaphor for, or analogue of the chemical composition of the sea.

3. Archipelago ~ CrayVox



Eight channel sound sculpture installed at the Space(D) Biennale 2012, Fremantle Arts Centre WA. Photo Credit – The Artist.

*This is the old Hessel Road
The home of Bear Island Cod
Where the Husdens speak only to the Helyers
And the Helyers speak only to God*

Many years ago I found this verse pinned to a bulkhead of a Sidewinder trawler in Hull on the cold North Sea. The saying "Salt is in the Blood" speaks not only of my family history but to our collective origins and reminder of our evolutionary prehistory.

The *CrayVox* project, commissioned by the Space(D) Biennale⁶ allowed me to reconnect with memories from early childhood, growing up in a small Sussex fishing village, the fisherfolk using open wooden boats and tarred wicker Lobster pots. The Lobsters of course were destined, then as now, for the wealthier members of the community, but we fared well enough by collecting small sweet Mussels, Periwinkles and Sea Lettuce

in rock pools with Sea Kale garnered from the shingle banks.

The dazzling bleached coral islands and brightly coloured shacks of the Houtman Abrolhos Islands, which became my home for several months during 2011, were simultaneously otherworldly but strangely familiar.

I had come with an open mind but also with many questions concerning the ecology and economy of Cray-fishing, curious about this isolated community and idiosyncratic lifestyle; my job in this situation, I decided, was to look and learn – but also to discuss and debate the future viability and sustainability of our marine ecologies and marine economies with my hardworking and generous host families.

The Abrolhos fishery is promoted as the world's first environmentally sustainable fishery¹⁰ and is heavily monitored and controlled by the department of fisheries. This however has driven considerable changes in both the fishing techniques, vessel size and economic risk, not to mention the fact that the catch is almost exclusively for export and therefore disconnected from the local food cycle, operating as a resource extraction industry not dissimilar to iron ore mining.

My task has been to develop a suitable metaphor to support and communicate the broad raft of ideas, images and information that accumulated during my sojourn on the Islands. The form of the Cray boat was chosen as a vessel to contain an audio-portrait of both the islands and my subsequent travels to Southeast Asia, following the export trail to seafood importers, restaurants and cooks. The skeletal vessel in the exhibition itself became a resonant object projecting the energy and complexity of the Abrolhos and its people.

Atoll.

The Island, a cemetery exhaled by the sea.

The tree of life,

calcinated to a bleached white clinker raft.

Whilst all around,

submerged beneath the endless sheet of water.

Fronds branch and entwine,

filament and fan, knoll and star.

Electric pink jostles acid green,

fading to sombre blue where the sharks sleep.

Nigel Helyer, IASKA CrayVox Blog

Post Office Island, Houtman Abrolhos WA
Photo Credit – The Artist



Stone.



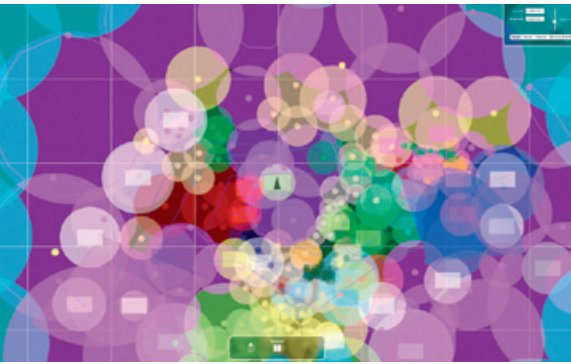
Maria, Basile Island, Houtman Abrolhos WA
Photo Credit – The Artist

A stone shown as a curio – for there are no stones on this island, only coral, loose brittle and resonant, bearing the imprint of life that thrives in the waters hard by the strand. One skims over acres of it en route to the nearby Basile Island, named for a family of Italian fishermen; or perhaps they are named for the Island, with lives and livelihoods so entwined with place it is hard to tell.

In the cul-de-sac of a cement path named Cathedral Street stands a miniature Catholic church, furnished with a neat array of small wooden school chairs, a series of ceramic tiles which illustrate the stations of the cross and two Madonnas, one a faded, framed print on the Altar, the other a plaster statuette balancing on a corner shelf; both gaze at wilted candles, a testament to passion past.

Basile is all neatness, its shacks painted in electric rainbow colours, the floats and ropes ordered as if by the compulsions of a Mediterranean matriarch with little else to do in a sleepy coastal village. The rock, likewise a transposition, arriving as ballast on a sailing vessel, which either floundered here or jettisoned this lode in lieu of a cargo, lies alongside a whale vertebrae and pearl nacre, a conduit to other worlds.

4. Island ~ Run Silent Run Deep



Interactive sound installation screen shot
Photo Credit ~ The Artist

*Be not afeared; this isle is full of noises,
Sounds and sweet airs that give delight
and hurt not.
Sometimes a thousand twangling instruments'
Will hum about mine ears; and sometimes voices
That, if I then had waked after long sleep,
Will make me sleep again; and then, in dreaming,
The clouds methought would open
and show riches
Ready to drop upon me, that, when I waked,
I cried to dream again.*

Caliban in "The Tempest" by William Shakespeare.

The cruiser drifts idly on the oily swells close to some small islands six nautical miles off the Singapore coast, engines off and all electronics cut. She is, as the submariners would say, *Running Silent, Running Deep*¹¹. A single blue cable snakes down into the opaque waters twenty metres below the hull, its hydrophone sensor recording the roar of biological static erupting from the claws of millions of Snapping Shrimp. Buried within this powerful foreground the occasional whinns and coughs of reef fish are set against the low frequency pulsing rumble of freighter props that form an ever-present sonic horizon.

Weeks of these recording trips to islands, to floating fish farms and the wetlands on the North coast gradually define an acoustic image of the island's complex marine environment. Plotted into an interactive sonic cartography using AudioNomad systems¹² the recordings form an acoustic halo around the Singapore shoreline. Satisfying as this might be, the island itself remains to be voiced and so the maritime recordings are gradually complimented by day upon day of recording work in this city state. Markets, temples, mosques, shopping malls and transitory phone conversations on the MRT jostle against blue comedians, karaoke, street ambience, Buddhist chanting and thunderstorms. The sonic cartography of Singapore finally takes form, installed in the National Museum, its interactive control surface navigated to form powerful immersive 3D sound mixes that retrieve

the intimacies of the Straits as well as the hubbub of Little India.

5. Lake ~ Weeping Willow



Blue Willow interview, HangZhou 2011
Photo Credit ~ The Artist

And truly a trip on this Lake is a much more charming recreation than can be enjoyed on land. For on the one side lies the city in its entire length, so that the spectators in the barges, from the distance at which they stand, take in the whole prospect in its full beauty and grandeur, with its numberless palaces, temples, monasteries, and gardens, full of lofty trees, sloping to the shore.

And the Lake is never without a number of other such boats, laden with pleasure parties; for it is the great delight of the citizens here, after they have disposed of the day's business, to pass the afternoon in enjoyment with the ladies of their families, or perhaps with others less reputable, either in these barges or in driving about the city in carriages.

Marco Polo on the lake at Kinsay (Hangzhou)

Yan Ping, my assistant, leads me by the arm into a small lakeside pagoda; she is clutching a Wedgewood Willow Pattern plate (made in China) and I a camera and audio recorder. Yan Ping addresses the seated couple who eye me with obvious suspicion and proffers the decorative plate, asking them to identify its provenance and the narrative it portrays. Foreign, they say, nothing to do with China, but looks like a fake Ming period! They are of course correct, but even so I am surprised that they fail to make the connection between the cobalt blue image of the lake and the serene view they are contemplating.

Weeping Willow addresses the cultural and ideological relationship between two Empires,

⁷ Toll was installed in an Atomic fallout shelter in Kassel, Germany as part of the Innenseit Projekt, during Documenta10.

⁸ Vox Aura; *The River is Singing* was commissioned by the Turku is Listening programme as part of Turku 2011, European Capital of Culture.



Detail of installation, ISEA, Istanbul 2011
Photo Credit ~ The Artist

Britannia and Cathay (China), both of which regarded themselves as the hub of the Universe. Eurocentrism demands that the Orient play a secondary role in the Arts and Sciences, obscuring the real source of much Occidental *Ars et Inventio* by relegating the Orient to the source of exotica, myth and superstition.

Underpinned by a long history of trade routes and sea-lanes, the two imperial centres engaged in a curious but problematic dialogue which ended ultimately in the Opium wars and semi-colonisation by European powers in the mid-nineteenth century, that established an axis of power which we are only now seeing reversed!

European commercial interests were matched at every turn by a fascination with Eastern Arts and Culture, with its complexity and historical depth which predated and overshadowed that of Europe's. Textile and ceramic wares in particular formed the basis for huge trade, carrying with it a range of iconography which shuffled across the cultural divide, to eventually hybridise in both the Occident and the Orient.

The Blue Willow, or Willow Pattern ceramic design is a perfect example of this process and forms the basis for *Weeping Willow*. Blue Willow was designed by Minton, an Englishman, and was initially produced by the Spode pottery in Staffordshire. The design is based upon the longstanding tradition of Ming porcelain blue-ware, with specific imagery drawn from the lakes and gardens in Hangzhou, notably the West Lake which has a deep-rooted and popular place in Chinese cultural history and is well-documented in the *Travels of Marco Polo*.

The European image proposes a narrative, reputed to be based upon a traditional Chinese tale of

unrequited love; however re-cast in the vein of Romeo and Juliet it becomes a European fiction, which only loosely follows a much more interesting Chinese mythic tale relating a love story between white and blue snake deities.

The vagaries of orientalism aside, to judge from the ubiquity of the design, Blue Willow is possibly the most widespread example of Chinoiserie, with production quickly being taken up in China and Japan as exports to Europe reversing, or perhaps amplifying the original orientalist trend. Even today Wedgwood's Blue Willow plates are manufactured in China by workers to whom the pattern is apparently without meaning.

Weeping Willow explores the vestiges of cultural memory invested in the design by asking locals in the Hangzhou area to identify and describe the stories embedded in the Blue Willow plate. These narratives are combined with narrations of the original love stories, both traditional and European and in turn mixed with early European accounts of China (for example Marco Polo's descriptions of exotic life in Hangzhou, which he identifies as Kinsay).

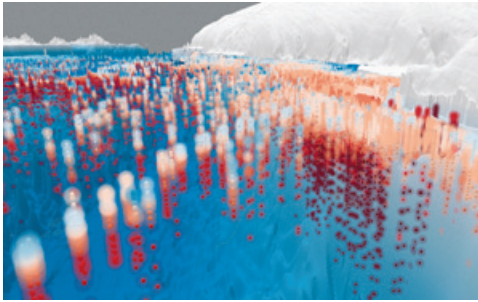
The work is presented as an interactive audio sculpture in the form of a dinner table, set with twelve Willow Pattern plates. Each plate treated to show only a fragment of the original pattern, in such a manner that the entire set combines to form the complete image. In turn each plate is mounted on an audio actuator rendering it in effect as a speaker allowing the dinner setting to manifest a multichannel, fragmentary audio narrative.

The position of the city is such that it has on one side a lake of fresh and exquisitely clear water, and on the other a very large river. The

waters of the latter fill a number of canals of all sizes which run through the different quarters of the city, carry away all impurities, and then enter the Lake; whence they issue again and flow to the Ocean, thus producing a most excellent atmosphere.

Marco Polo on Kinsay (Hangzhou)

6. Ice shelf ~ Bio_Logging and Under the Icecap



Screen shot of data generated bio-logging data showing Elephant Seal dive patterns. Photo Credit ~ Dr. Mary-Anne Lea IMAS

Land and Water are chalk and cheese. Apart from sleeping in a mud wallow, land can be big trouble, females to keep an eye on, a regular harem, with all their attendant demands. Then there is the fighting, a constant stream of young studs trying their luck and it gets nasty, blood everywhere, females injured and pups crushed – that's land for you!

On the water it's different, solo, quiet. Surface alongside the sheet ice, re-breathing for a couple of minutes, one big exhalation and then slipping slowly down. Heartbeat restrained to eight beats a minute, down and down to a thermal vent two thousand metres below the surface, a four thousand kilogramme, six metre body gliding into a frigid, inky darkness, bespeckled with the photophores of lantern fish and bioluminescent medusae.

Under the IceCap is an Art + Science collaboration between myself and Marine Scientist Dr. Mary-Ann Lea¹³ at the Institute for Marine and Antarctic Studies of the University of Tasmania, which visualises and sonifies complex bio-logging telemetry data collected by Elephant Seals¹⁴ on their deep dives under the Antarctic Ice shelves and long Southern Ocean transits. The project explores novel ways to make these data-sets palpable, by manifesting them as a series of interactive sonic cartographies and experimental music concerts. Each concert in the series is designed to test the hypothesis that musical training is particularly well adapted to negotiate complex streams of data unfolding in real-time. The work experiments with ways for musicians to respond to data generated 3D mappings, visual scores and direct data sonifications.

We are listening for the potential resonances and confluences that bridge the data and the sonic response with the aim to extend the conceptual and intuitive grasp of otherwise extremely abstract data. Through a process of iteration we hope to locate a *sweetspot* that connects traditional scientific approaches with a creative sensibility, searching for a form that combines cultural *affect* with scientific *utility*, thus opening an enormous range of human enquiry into the natural world to a wider public.

7. Inundation ~ Deluge



Southern Elephant Seals showing bio-logging device
Photo Credit ~ Ben Arthur IMAS

All day long the South wind blew rapidly and the water overwhelmed the people like an attack. No one could see his fellows. They could not recognize each other in the torrent. The gods were frightened by the flood, and retreated up to the Anu heaven. They cowered like dogs lying by the outer wall. Ishtar shrieked like a woman in childbirth.

The Mistress of the Gods wailed that the old days had turned to clay because she said evil things in the Assembly of the Gods, ordering a catastrophe to destroy the people who fill the sea like fish. The other gods were weeping with her and sat sobbing with grief, their lips burning, parched with thirst.

The flood and wind lasted six days and seven nights, flattening the land. On the seventh day, the storm was pounding like a woman in labour.

The sea calmed and the whirlwind and flood stopped. All day long there was quiet. All humans had turned to clay. The terrain was as flat as a roof top. Utnapishtim opened a window and felt fresh air on his face. He fell to his knees and sat weeping, tears streaming down his face. He looked for coastlines at the horizon and saw a region of land. The boat lodged firmly on Mount Nimush which held the boat for several days, allowing no swaying.

On the seventh day he released a dove which flew away, but came back to him. He released a swallow, but it also came back to him. He released a raven which was able to eat and scratch, and did not circle back to the boat. He then sent his livestock out in various directions.

Gilgamesh Tablet eleven (XI)

Odysseus scanned his crew as they pulled against the oars of their galley. Forewarned by tales of Jason's voyage in the Argos, Odysseus moulded wax into the ears of his crew and then lashed himself to the vessel's mast to resist the Siren's fatal song. The men rowed in silence, their waxen plugs reproducing the labyrinth of their pinnae, prefiguring the spirals of Edison's phonography inscribed into his wax cylinders. In the silence each man replaying the rhythms of his pulse to evade the deadly intoxication of song. Danger past, Odysseus scowls at his men who had steadfastly refused to release him to follow the Siren's hypnotic call.

Fifteene cubits vpward, did the waters preuaile; and the mountaines were couered.

And all flesh died, that mooued vpon the earth, both of fowle, and of cattell, and of beast, and of euey creeping thing that creepeth vpon the earth, and euey man.

All in whose nosethrills was the breath of life, of all that was in the dry land, died.

And euey liuing substance was destroyed, which was vpon the face of the ground, both man and cattell, and the creeping things, and the foule of the heauen; and they were destroyed from the earth: and Noah onely remained aliue, and they that were with him in the Arke.

Genesis, 1611 King James Bible

These ancient narratives of the Deluge represent the earliest human collective memory of the cataclysmic flooding of the Black Sea region which occurred some seven thousand years ago. It is thought that rising sea levels, fed by the melt waters at the thaw of the last Ice Age, scientifically known as "Meltwater Pulse 1", broke through the land formations surrounding the original fresh water lake that we now know as the Black Sea, admitting a massive flood¹⁵ that inundated the ancient agricultural societies and searing the disaster permanently into human collective memory.

The aim of *Deluge* is to seek out traces of these deep memories – the earliest to recount an environmental disaster, locating them in folk tales, song, images and objects and to link these mnemonic objects with contemporary awareness and debate concerning our current environmental conditions, climate change and increased sea levels.

The metaphor of the *Deluge* will bridge the various ethnic, faith and generational sections in selected communities along the shores of the Black Sea coupling biological memory with contemporary life.

Whilst art cannot easily solve the problems of a participatory democracy, it can act to build bridges and engender new approaches to intransigent issues. The *Deluge* project is designed to fit (or float) in the interstitial spaces between science, the environment, economic and social interests,

acting as a catalyst to generate social engagement with an understanding of ecological issues and the competing interests of economics and ecology.

We cast off sometime in the near future!



Concert at the Hobart Conservatorium of Music (UTAS) 2012 with the iCon group responding to data generated graphical scores and dynamic maps. Photo Credit – The Artist

⁹ *Space(D) Biennale*, Fremantle Arts Centre, Western Australia, February – March 2012. Curator Marco Marcon of IASKA.

¹⁰ The Aboholos Islands are protected as an A-Class Nature Reserve – it is interesting to reflect that only 4% of Australian waters are protected as marine parks and reserves and globally only 0.36% of the oceans (which account for 70% of the planets surface area) are afforded protection.

¹¹ *Run Silent Run Deep* was commissioned by ISEA (International Symposium of Electronic Arts) and undertaken during a three-month Artist-in-Residency at the Tropical Marine Institute of the National University of Singapore. The resulting interactive sonic cartography work was shown at the Singapore National Museum 2008.

¹² *AudioNomad* is an art and science research programme co-founded by Dr Nigel Helyer (creative director) and Dr Daniel Woo (scientific director). The collaboration develops location-aware virtual and augmented audio-reality for mobile users. *AudioNomad* has exhibited surround-sound installations on ships; mobile devices for individual pedestrian use; and interactive surround-sound installations for museum exhibition.

¹³ This project is supported by The Australian Network for Art and Technology (ANAT) and the Australian Government through the Australia Council, its arts funding and advisory body.

¹⁴ *Some facts and figures: The Southern Elephant Seal is the largest pinniped and exhibits strong sexual dimorphism, the males being significantly larger than the females. Males have been recorded to weigh up to 4000Kg with a length of 6.85 m. The smaller females forage mainly in the pelagic zone whilst the males will forage in both pelagic and benthic zones, diving to depths of up to 2000 m with the ability to remain submerged for two hours. There are three main sub-populations, the South Atlantic, the Indian Ocean and the sub-Antarctic islands of the Pacific Ocean. Bio-logging devices are attached once the animal has moulted and with luck can remain in-situ for up to a year. The device transmits a range of data to a satellite each time the seal surfaces providing information about location, temperature, salinity, pH and other water qualities etc. Because of their capacity to dive deep in the water column and their habit of foraging under the Antarctic ice shelves Elephant Seals have provided information otherwise unobtainable about Polynyas, ice free areas associated with the production of ocean currents (thermohaline circulation) vital indicators of global climate change.*