Md-12 Individual Animal Report Excerpted from:
2005 Ketten, D. R., Beaked Whale Necropsy Findings for Strandings in the Bahamas, Puerto Rico, and Madeira, 1999-2002. WHOI Technical Report WHOI-2005-09. pp. 1-38 at

http://www.whoi.edu/csi/images/WHOI-2005-09.pdf

Specimen ID/sex: 12-Md male 11 feet total length
Species: *Mesoplodon densirostris*
Date of stranding: reported 16/03/00; presumed 15/03/00
Location: Cross Harbour Creek, Abaco (25 58N 77 16W)
Preliminary condition: Code 2/Dead-fresh
Analyses to date: CT scans
Tissue Dispositions:
Head/frozen - Ketten
All other tissues - Balcomb

Observations/other observers:
March 16, 2000, 1000 local time, an eleven foot, male, dense-beaked whale (*Mesoplodon densirostris*) was found by Diane Claridge stranded dead in the mangrove lagoon of Cross Harbour Creek, Abaco (25 58N 77 16W). The body was towed to a nearby beach and a body cavity necropsy performed by BMMS personnel. The specimen was reported by D. Claridge and K. Balcomb to be in an excellent state of preservation and was estimated to have been dead less than twenty-four hours on sighting. If this conclusion is correct, it is likely this whale died early on March 16. The body necropsy was photographed and videotaped by K. Balcomb. The head was removed and placed in a conventional chest freezer by 1730 local time, and the frozen head was transported by air to D. Ketten on 30 March 2000.

Observations/Ketten/Cranial/Temporal regions:
The frozen head was transported in an insulated box by charter and commercial airlines from Abaco to Boston on 30 March 2000 with a total transit time of 9 hours. On arrival the specimen was transported by van to the scan facility of Mass. Eye and Ear Infirmary. Scanning of this and all coincident specimens in the shipment took place over an 8 hour period between 19:30 to 0300. During that time, the head was removed from the external container but remained inside two sealed plastic bags during scanning. There was no evidence of thawing of any but the most superficial layers during the scan sessions. Following scanning, the head was returned to the van, driven to WHOI, and placed in a -20 degree C freezer where it currently remains in a locked body bag. All observations noted below are based on the available CT data.

The specimen was scanned in the transaxial plane using an ultra high resolution spiral CT protocol with O degree gantry tilt. Three and 1 mm acquisitions were obtained; submillimeter images of the inner ear were reformatted at 0.1 mm increments from the 1 mm spiral data. Ultra-high resolution bone kernels were used for the inner ear images; both conventional clinical soft-tissue and bone kernels were used for the brain and fluid labyrinth imaging. 2D scan images, histograms of intralabyrinthine attenuation characteristics for the inner ears and subarachnoid areas, and 3D reconstructions of target tissue segmentations were imaged and filmed.

The head is well-preserved with little evidence of freezer artifact. The brain is well formed with no evidence of large or abnormal air pockets. The sulci and ventricles are well defined and normal. The brain is centrally positioned and the subarachnoid areas are clear with the exception of a discrete ovoid (54 by 41 mm) subarachnoid hemorrhage in the left temporal fossa.
There is no evidence of any cranial fracture in the scans and no indication of other gross hemorrhagic areas. The brain densities are normal bilaterally. The narial passages are clear and aerated as are the sinus, oral cavity, Eustachian tubes, and middle ear spaces. There are no scan indicators of gross hemorrhagic areas in the middle ear or peribullar spaces. Blood was observed bilaterally in the inner ear and in the cochlear apertures. Intracochlear blood is evident in the cochlear aqueduct and in the perilymphatic spaces and is most abundant in the basal turn.

Findings:
Based upon scan images, the head is in an excellent state of preservation. The lack of overt fractures, particularly to the temporal bone, ossicles or other cranial regions, suggests the animal was not subjected to an intense blast. The gross condition of the tympano-periotic complex is consistent with a healthy adult ear. The presence of a subarachnoid hemorrhage and the absence of pooled blood in other cranial fossa and otherwise normal aerated spaces is significant. In particular, the position and containment of the subarachnoid hemorrhagic and of the restriction of the clots to the dorsal surface of the ventricles is not consistent with post-mortem pooling. The presence of intracochlear blood and its dispersal pattern are also consistent with the subarachnoid hemorrhage and suggest a cochlear aqueduct route, at least unilaterally, for deposition of blood into scala tympani. This pattern of bleeding is consistent with a concussion derived from any number of sources, including direct trauma, blast trauma, or impulsive noise, or explicitly from any underwater source that mimics sonic boom insults. Similar patterns are also observed in birth trauma and diathetic disease. The presence of blood in the contralateral ear may result from the same conditions with or without a localized subarachnoid hemorrhage; i.e., intracochlear bleeding has also been reported without concomitant intracranial bleeding. Therefore, the CT results clearly demonstrate a hemorrhagic condition that is likely to be an *in vivo* insult of traumatic origin (considering the age and general condition of the animal and pending the body necropsy findings). However, while these results are strongly suggestive of a pressure induced trauma, without further finer grained histologic analyses, it is not possible to independently speculate on the required characteristics of a source

Summary: (See also laboratory dissection notes)

Good preservation/Left subarachnoid hemorrhage/Clots bilateral lateral ventricles/Ethmoid sinus hemorrhage/Minor hematomas narial plugs/Laryngeal bruising/Minor melon contusions/Minor bruising Lt lateral mandibular fats/Extensive hemorrhage Rt mandibular fats/Mandibular contusion Rt/Minor retrobullar hemorrhage Rt/Eustachian clots/Bilateral intracochlear blood/Intraductal blood bilateral/