

Incident Report- Beluga whale, ID 'Havana'

Summary

A female beluga whale ID 'Havana' under research permit #22629 was moved from Marineland in Canada to Mystic Aquarium. While the whale initially acclimated well for several months, the whale developed medical issues in the Fall of 2021. Despite 24-hour care and intensive medical, behavioral, and nutritional support provided by a team of veterinarians including several that are board certified by the American College of Zoological Medicine, the whale died.

Complete Description of Events

A female beluga whale ID 'Havana' was transported successfully to Mystic Aquarium on May 15, 2021, from Marineland in Canada. Preshipment diagnostics and transport planning conducted by Marineland veterinarian, Dr. June Mergl, and overseen by the Canadian Food Inspection Agency, a Canadian science-based regulator with a mandate encompassing food safety, and animal and plant health, included bloodwork indicative of healthy, stable condition, negative for all infectious diseases tested, and gastric sample and respiratory sample testing that were normal. The transport was also approved by Mystic Aquarium veterinarians, board certified by the American College of Zoological Medicine.

The transport occurred without incident or complication on May 15, 2021. In the weeks following transport the whale appeared normal and the whale's bloodwork began showing evidence of a systemic inflammatory process so antimicrobial treatment was initiated on May 27, 2021. On July 29, 2021, the whale developed blepharospasm (squinting) in the right eye and began treatment for keratopathy. An ophthalmologist with expertise in marine mammals was consulted on treatment, which was implemented. The whale was diagnosed with hemorrhagic gastritis on September 7, 2021, which responded well to treatment. On November 6, 2021, the whale stopped eating and was noted to be periodically swimming with closed eyes and contacting wall during swimming from time to time. For this reason, the whale was moved to an off-habitat pool to allow for closer monitoring and more directed medical and nutritional support. The whale was treated for three episodes of hemorrhagic gastritis (November 8, 2021, December 20, 2021, and January 24, 2022), all of which responded well to treatment with gastrointestinal medications. The whale remained on daily nutritional support to maintain body condition, including fish gruel, and eventually moving to assist feeding whole fish as she improved. Between November 2021 and February 2022, the animal periodically exhibited abnormal swimming behaviors. The first significant abnormal episode occurred on November 11, 2021, where an abnormal swimming pattern and tachypnea (elevated respiratory rate) were observed. The whale was started on antibiotics, continued on supportive care, and returned to normal. Subsequent episodes of abnormal behavior were observed over the following 3 months that were short in duration, variable in character (listing, rolling ventral, sinking, appearing disoriented, changes in swim character) and, for each, the whale resumed normal behaviors and swim pattern thereafter. Numerous diagnostics were conducted during this time including infectious disease testing, neurological examinations, and imaging, and did not determine any cause for this behavior. Several veterinarians with cetacean expertise were brought in to consult on this whale's case and ensure that everything possible was being done. The whale remained under treatment for chronic systemic inflammation with antimicrobials and other supportive medications during this time.

Pulmonary abnormalities were first diagnosed via lung ultrasound on February 9, 2022, and the whale was promptly started on new oral antimicrobial medications that day. The prior lung ultrasound, conducted on January 12, 2022, was normal, without indication of pulmonary pathology. On the evening of February 9, 2022, when the whale first demonstrated a marked change in respiratory effort and character, veterinarians switched the whale's treatment to injectable antibiotics and a third-generation

antifungal agent. The whale had an improved appearance during the day on February 10, 2022. Despite 24-hour care and intensive medical management, early in the morning on February 11, 2022, the whale exhibited an abrupt period of high energy and disoriented swimming and died soon thereafter. The whale was transported later that day to the University of Connecticut Pathobiology Laboratory for necropsy. A gross necropsy report (Accession # 22-310) is attached to this incident report. Cause of death is pending histopathologic review.

This death was the result of a health issue and is unrelated to any research being performed.

Attending Veterinarians

Molly E. Martony, DVM, Diplomate American College of Zoological Medicine

Eric T. Anderson, DVM, Diplomate American College of Zoological Medicine

Supervised by Allison D. Tuttle, DVM, Diplomate American College of Zoological Medicine

Research Samples Collected

A summary of research samples collected on this animal at Mystic Aquarium follows:

- The animal provided behavioral saliva samples on May 14, 15, 16, 21, 25, 27; June 3, 17, 18, 25; July 16; Aug 3, 2021.
- Microbiome samples (oral, skin) were collected under behavioral control on June 15, 24; July 15, 22, 2021. A microbiome skin samples was also collected opportunistically in the stretcher on May 14, 2021.
- An opportunistic fecal sample was collected from the pool on June 17, 2021.
- Blood was obtained upon arrival on May 14, 2021.
- Respiratory exhale (blow) samples were collected opportunistically on May 14, 2021, and then behaviorally on June 17; July 8, 16, 22; August 3, 2021.

We believe this to be an animal health event and in no way related to the research being conducted. Research sampling was paused on August 6, 2021, and no samples were taken for research for the entirety of the animal's illness.

Identification of Steps to Reduce Risk of Additional Events

This case was an unpredictable health issue in an animal that had been cleared by qualified veterinarians in Canada and the United States to be transported. We have ensured and will continue to ensure that medical conditions in one whale do not pose risk to the others. As research sampling paused on August 6, 2021, and the whale was not sick until the Fall of 2021, we do not believe research contributed to this case in any way. Similarly, no communicable diseases that could impact other whales have been identified.

Accredited by the Association of Zoos and Aquariums (AZA), the Alliance of Marine Mammal Parks and Aquariums (AMMPA), the International Marine Animal Trainers Association (IMATA), and certified by American Humane (AH), Mystic Aquarium consistently provides the highest quality medical and husbandry care to our animals. Our veterinary program is led by experienced veterinarians who are board-certified specialists in zoological medicine and our facility has over 4 decades of experience in providing the highest quality husbandry care for belugas. With a strong focus on preventative medicine, our animals are well-monitored during periods of health and receive prompt attention to all medical or behavioral concerns. A fully functioning clinical lab and veterinary hospital equipped with portable ultrasound, endoscopy, and radiography are on site for immediate diagnostic results when any condition

arises. When necessary, Mystic Aquarium provides 24-hour care to our animal collection. A 24-hour monitoring system has been in place for belugas at Mystic Aquarium for months and was in place for the entirety of this animal's medical issues and continues to present day. Recently the aquarium has hired 2 additional veterinarians experienced in the care of cetaceans, 3 certified veterinary technicians, and complete second and third shift staff for husbandry and life support systems operation, ensuring robust staffing for all 3 shifts. Additionally, 3 veterinarians-in-residence have been retained for veterinary support and consultation, and we are consulting with beluga experts across the country. This exceptionally high platform of animal care ensures the maximal welfare for all our animals. We will continue to provide our consistently exceptional animal husbandry and veterinary care as we move forward.

MARINE MAMMAL DATA SHEET

Form Approved by OMB No. 0648-0084
Expires 11-30-2023
Page: 1 of 1

NOAA Animal ID: NOAA0010675

(Generated on: 2022-03-17)

I. Animal-Specific:

NOAA Identification No.	NOAA0010675	Sex	FEMALE
Common Name	Beluga Whale	Scientific Name	Delphinapterus leucas
Birth Date	07-13-2015	Birth Date Certainty	ACTUAL
Captivity Date	07-13-2015	Captive Origin	BIRTH
Permit No.		Collector	
Geographic Location	Lat: : ' ' ' / Lon: : ' ' '	Geographic Name	
Review Date	08-27-2020	Review Status	
Reviewer Comments/Notes			

II. Owner/Facility-Specific:

Owner (Person or other Entity With Custody of the Marine Mammal)	Mystic Aquarium
Facility (if different from Owner)	Mystic Aquarium
Custody Date	05-14-2021
Facility Date	05-14-2021
City/State/Zip of Facility (include Country for foreign facilities)	Mystic, CT 06355 US
Animal Identification No. (assigned by facility)	XDL11
and/or	
Animal Name (assigned by facility)	HAVANA
Purpose(s)	Scientific Research

III. Disposition:

Death Date	02-11-2022		
Death Cause	Undetermined ()		
Death Cause Comment	TBD, Pathology report pending as of 3/8/2022.		
Release Date:	Permit No:	OR	<input type="checkbox"/> Unauthorized release/escape (reintroduction)
Geographic Location:	Lat: : ' ' ' / Lon: : ' ' '	Geographic Name:	
Tag number or description of other identifying markings:			

IV. Animal Historical Transfer/Transports:

Type of Activity: TRANSPORT	Permit Number: 22629	Start Date: 05-14-2021
From Facility: Marineland of Canada	To Facility: Mystic Aquarium	
Type of Activity: TRANSFER	Permit Number: 22629	Custody Date: 05-14-2021
From Owner: Marineland of Canada	To Owner: Mystic Aquarium	

MARINE MAMMAL DATA SHEET (MMDS)
for Reporting Captive Births or a Death/Release/Escape

OMB No. 0648-0084
Expires 11/30/2023
NOAA FORM 89-882

I. Reporting a Captive Birth:

NOAA Identification No. - To be assigned by NIMM

Sex Male Female Unknown

Species Common Name _____

Birth Date _____

Birth Date Certainty Actual Estimated

Owner (Person or other Entity With Custody [i.e., ownership]) _____

Facility (Physical location of the animal; if different from Owner) _____

Animal Identification No. _____

or

Animal Name _____

Purpose Public Display Scientific Research Enhancement Research and Enhancement Rehabilitation
 Department of Defense; choose one of the following: Active Retired Breeding Loan

Permit No. _____ (as applicable)

II. This Section is intentionally left blank

III. Reporting a Disposition (Death or Release/Escape):

Note: If you have a previously provided MMDS specific to your marine mammal, please use that MMDS to report the disposition of your marine mammal. You may request a MMDS for your marine mammal by contacting us via any of the contact options provided on page 2.

NOAA Identification No. NOA0010675

Animal Identification Number or Animal Name XDL11 HAVANA

A. Death Date 2/11/2022

Cause of Death TBD, Pathology report pending as of 3/8/2022

B. Release Date _____

Permit No. _____ OR Unauthorized release/escape

Geographic Location _____ (as applicable) Lat: / Lon:

Tag number or description of other identifying markings: _____

Marine Mammal Data Sheet (MMDS) Instructions and Notes

In accordance with the Marine Mammal Protection Act of 1972, as amended (MMPA) (16 U.S.C. 1361 *et seq.*), the National Marine Fisheries Service (NMFS) is required to establish and maintain an inventory of marine mammals under its jurisdiction (cetaceans and pinnipeds, except walrus) that are held in permanent captivity within the United States for public display. Animals held for scientific research or/and enhancement are also reported as per requirements of the permits, and animals held for national defense purposes have been voluntarily submitted to the inventory by the Navy.

The MMPA requires marine mammal owners and facilities to report when animals enter (i.e., births, transfers/transports) and leave their collections (i.e., death, release, transfer/transport). Inventory information submitted via this form will be entered into the National Inventory of Marine Mammals (NIMM).

- Births must be reported within 30 days after the date of the birth.
- Deaths should be reported within 30 day with the date and cause of death. If the cause of death has not been determined at the time of reporting, you may indicated that results are pending and update the cause of death once the results have been received.

Documentation required for this information collection is subject to the Freedom of Information Act (FOIA). Personal or sensitive information that is subject to the Privacy Act will be redacted under FOIA.

QUESTIONS?

For additional information regarding marine mammal inventory reporting requirements under the MMPA, please visit our [website](#).

If you need assistance completing this form or would like to submit a completed form, please contact the Permits and Conservation Division via:

- a. Email (NIMM.Inventory@noaa.gov);
- b. Phone: 301-427-8401; or
- c. Mail (NMFS Permits and Conservation Division (F/PR1), 1315 East-West Hwy, Silver Spring, MD 20910).

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including the time for reviewing instructions, search existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information to complete this form. Send comments regarding this burden estimate or any other aspect of this collection of information including suggestions for reducing this burden, to the Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910. Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the Paperwork Reduction Act, unless the collection of information displays a currently valid Office of Management and Budget (OMB) Control Number.

Table 1. Data dictionary for MMDS fields.

MMDS Field	Definition
NOAA Identification Number	The NOAA-assigned unique identification number (NOAXXXXXXX) that stays with the animal for all time
Sex	The sex of the subject animal
Species Common Name	The common name of the species
Birth Date	The actual or estimated birth date of the animal
Birth Date Certainty	Identifying the birth date as actual or estimated
Owner	Person or institution with legal custody (ownership) of the animal
Facility	Name of the physical location (institution) where the animal is held
Animal Identification Number	ID Number assigned by the Owner or Facility (only ID or name is required)
Animal Name	Name assigned by the Owner or Facility (only ID or name is required)
Purpose	The purpose or legal authority under Section 104 for which a marine mammal is being held (Public Display, Scientific Research, Enhancement, Rehabilitation (e.g. non-releasables), or Department of Defense)
Permit No.	NMFS permit number associated with a birth (if applicable)
Death Date	Date the animal died
Cause of Death	Primary cause of death of the animal
Release Date	Date the animal was released or escaped (if applicable)
Permit No.	NMFS Permit Number associated with a release (if applicable)
Unauthorized release/escape	Identifies whether the release was authorized under a permit or not
Geographic Location	General description of the geographic location associated with the release/escape of an animal; optional field
Latitude and Longitude Degrees	Identifies DMS location associated with the release/escape of an animal; optional field
Tag number or Description of other identifying markings	Tag Number or Description of an animal that has been released/escaped; optional field



Connecticut Veterinary Medical Diagnostic Laboratory

Department of Pathobiology and Veterinary Science • College of Agriculture and Natural Resources
61 North Eagleville Road Unit 3089 • Storrs, CT 06269-3089
phone: 860-486-3738 • fax: 860-486-3936 • web: www.CVMDL.uconn.edu

Accession No: 22 - 310
FINAL REPORT

ANDERSON, DR. CHELSEA
MYSTIC AQUARIUM
55 COOGAN BLVD
MYSTIC CT 06355

Date Collected: 2/11/2022
Date Submitted: 2/11/2022
Date Reported: 4/20/2022

PH: 860-572-5955 FAX: 860 - 572-5972

Animal ID:	Species:	Breed:	Sex:	Age:	Wt:
Havana	Marine	Beluga	F	6Y	377 kg

FINAL DIAGNOSIS:

NEURONAL VACUOLATION AND SWELLING (INDICATIVE OF STORAGE DISEASE)
CERVICAL MYELIN SHEATHS DILATION WITH SPHEROIDS
PULMONARY EDEMA AND CONGESTION WITH
PULMONARY TUNICA MEDIA HYPERPLASIA
MYOCARDIAL LOSS AND REPLACEMENT FIBROSIS, WITH ENDOCARDIOSIS
HEPATIC CENTRILOBULAR CONGESTION, WITH HEPATOCELLULAR VACUOLATION
PANCREATIC ZYMOGEN DEPLETION
GASTRIC MUCOSAL HEMORRHAGE
CHRONIC TRACHEAL ADENITIS AND LARYNGITIS
LYMPHADENAL HEMORRHAGE AND EDEMA

MORPHOLOGIC DIAGNOSIS:

BRAIN: neuronal swelling and vacuolation, multifocal, marked, with spheroids and perivascular hemorrhage with intracytoplasmic PAS positive granules
CERVICAL SPINAL CORD: axonal myelin sheaths dilation locally extensive, marked, with spheroids
LUNGS: [1] interstitial edema, diffuse, marked, with diffuse congestion; [2] tunica media hyperplasia, diffuse, marked, with perivascular edema; [3] few alveolar bacteria and fibrin, multifocal, moderate
TRACHEA: lymphoplasmacytic submucosal adenitis, multifocal, mild
LARYNX: lymphohistiocytic submucosal and mucosal laryngitis, multifocal, mild
HEART: [1] endocardiosis, mild; [2] myocardial replacement and fibrosis, multifocal, moderate
LIVER: [1] centrilobular congestion, diffuse, marked, with moderate intracytoplasmic brown granules (negative for iron and bile) and minimal hepatocellular necrosis; [2] hepatocellular vacuolation mild with rare intracytoplasmic PAS positive granules
STOMACH (1ST COMPARTMENT): surface reddening and edema, multifocal, moderate
STOMACH (2ND COMPARTMENT): mucosal hemorrhage, multifocal, marked
PANCREAS: zymogen granule depletion, diffuse, marked
LYMPH NODE: hemorrhage and edema, locally extensive, moderate
SMALL INTESTINE: mineralized foci, multifocal, moderate

COMMENTS:

There were multiple significant lesions in this beluga whale, primarily in the brain, lung, and heart. In multiple sections of the cerebral cortex, there were grey matter areas with neuronal swelling and vacuolation that often-contained PAS-positive granules; this presentation is consistent with a storage disease. This storage disease could serve as an explanation for the neurologic signs and vision impairment described in the clinical history especially in the absence of an infectious agent and absence of ocular lesions. The cervical spinal cord had marked dilated axons with rare spheroids that also would have contributed to the neurologic signs. In other species affected with storage diseases the age of onset, manifestation of disease and speed of progression vary with type of storage disease i.e. enzyme activity. Electron microscopy, enzyme assays, special stains on frozen sections and or sequencing are

required to characterize the type of storage disease in this Beluga whale. For these testing additional cost will be required as the samples needs to be send outside of CVMDL for testing.

The lungs contained multiple significant lesions that would coincide with the gross anatomic lesions identified on necropsy, which could ultimately be secondary to the gross and microscopic lesions in the heart. This combination of lesions along with the centrilobular congestion in the liver could be an indicator of acute cardiac failure. It is unclear if the lesions in the brain contributed to this by affecting the respiratory center. Although mild, the hepatocellular vacuolation in the liver is very interesting and along with the PAS positive material within those hepatocytes are indicative of the mechanism similar to that of the brain in this Beluga whale. The storage diseases often manifest in multiple cell types, hepatocytes being one of them. There were other lesions within the gastrointestinal tract including the second compartment, which could be associated with stress and could be a precursor to gastric ulceration. Pancreatic zymogen depletion has been associated with decreased protein uptake and/or metabolism. The hemorrhage and edema in the lymph nodes could be interpreted as agonal.

LABORATORY FINDINGS

BACTERIOLOGY RESULTS:

Havana Stomach Fresh Tissue Culture-Pathology Aerobic - **E. coli(moderate), Staphylococcus species(moderate)**

Havana Stomach Fresh Tissue Culture-Pathology Anaerobic - **Negative**

Havana Lung Culture-Pathology Aerobic - **E. coli(heavy), Staphylococcus species(moderate)**

Havana Lung Swab Culture-Pathology Aerobic - **Negative**

Havana Brain Swab Culture-Pathology Aerobic - **E. coli(moderate), Enterococcus faecalis(moderate), Sporolactobacillus nakayama(moderate)**

Robert Polkowski, BS; Lead Technician Mastitis and Microbiology; Technical Assistant Avian and Regulatory Serology 2/18/2022

Havana Brain Swab Culture-Pathology Anaerobic - **Clostridium perfringens**

Havana Lung Fungal Culture - **Mold present on all plates**

Robert Polkowski, BS; Lead Technician Mastitis and Microbiology; Technical Assistant Avian and Regulatory Serology 2/23/2022

REFERRAL LABORATORY TEST RESULTS:

Referral Lab: Fungus Testing Laboratory (FTL), The University of Texas Health Science Center at San Antonio, San Antonio, Texas

Specimen(s) Submitted: **Lung**
Test Requested: **Fungal Identification**

Result: Original isolate submitted held for 8 days an no fungal growth was recovered. Testing canceled.

Testing Performed by: Carmita Sanders 3/9/2022

Transcribed by: Jessica Bogle, BS; Administrative Program Support I: Accessioning/Necropsy. 3/10/2022

PATHOLOGIC FINDINGS

HISTORY:

New acquisition from another institution May 2011. Initially well. Developed eye issues and variable gastritis/stress ulcers. Possibly neuro. Recent u/s scans question resp d2. Under treatment intensely since October. Most recent therapy: voriconazole, amikacin. Recent azithromycin and levofloxacin.

GROSS FINDINGS:

A 6-year-old, 377.3kg, female beluga whale (*Delphinapterus leucas*, Mystic Aquarium ID: Havana) was presented for postmortem examination. The beluga was in good body condition. There was abundant foam exuding from the blowhole that extended down the larynx, trachea, and the lungs. Bilaterally, the lungs were non-collapsed, mottled purple to pale tan and markedly rounded

margins. The pericardial sac was adhered to the ventral and lateral aspects of the thoracic cavity. The epicardial surface of the heart was diffusely glistening. Bilaterally, the atrioventricular valves were mildly thickened and nodular. The liver had an enhanced reticular pattern. The kidneys were bilaterally congested. The second gastric compartment was diffusely reddened and edematous. Intestines contained normal digesta.

Measurements:

Snout to Melon: 4.5cm
Snout to Angle of Mouth: 18cm
Snout to Blowhole: 27cm
Snout to Center of Eye: 23.5cm
Snout to Anterior Insertion of Dorsal Fin: 131cm
Snout to Tip of Dorsal Fin: 168cm
End of Melon to Fluke Notch: 310cm
Snout to Anterior Insertion of Flipper: 63cm
Snout to Caudal End of Ventral Groove: 34cm
Snout to Center of Genital Aperture: 218cm
Snout to Center of Anus: 223cm
Center of Blowhole to Dorsal Ridge: 100cm
Center of Blowhole to Peduncle: 250cm
Flipper Length: 37.5cm
Flipper Width (maximum): 25.5cm
Fluke Width: 68.5cm
Dorsal Fin Height: 3cm
Girth At Neck: 115.5cm
Girth at Axillary: 171cm
Girth at Maximum(Anterior to Dorsal Ridge): 181cm
Girth At Center of Dorsal Ridge: 172cm
Girth at Level of Anus: 96.5cm
Girth at Mid Peduncle: 46cm
Blubber Thickness: Dorsal: 3cm
Blubber Thickness: Lateral at Mid-Length: 4cm
Blubber Thickness: Ventral at Mid-length: 4cm

HISTOPATHOLOGY:

Histologic sections of the following tissues were evaluated on slides A-BD: BRAIN, EYES including LENS, TRACHEA, LARYNX, ESOPHAGUS, LUNG, HEART, LIVER, KIDNEY, SPLEEN, STOMACH (FIRST, SECOND, and THIRD COMPARTMENT), SMALL INTESTINE, LARGE INTESTINE, OVARY, MESENTERIC LYMPH NODE, DIAPHRAGM, SKELETAL MUSCLE, BLUBBER (DORSAL, LATERAL, and VENTRAL).

SPECIAL STAINS:

TWORT'S TISSUE GRAM STAIN. SLIDES L, M & AM. LUNG: Few bacteria within alveoli are predominantly gram-negative short rods with few gram positive cocci.
SLIDE Q. STOMACH: Few bacteria within affected regions were gram-negative short rods.
SLIDE AX. BRAIN: No bacteria were appreciated within representative sections.

GROCOTT METHENAMINE SILVER STAIN. SLIDES L, M & AM . LUNG: No fungal hyphae or conidial spores were identified with representative sections.

SLIDE Q STOMACH (SECOND COMPARTMENT): No fungal hyphae or conidial spores were identified with representative sections.

LUXOL FAST BLUE STAIN. SLIDES AZ, BB, & T. BRAIN AND CERVICAL SPINAL CORD: Axons were not demyelinated in representative sections.

GLIAL ACIDIC FIBRILLAR PROTEIN IMMUNOHISTOCHEMISTRY. SLIDE BB. BRAIN: Neuronal cytoplasm diffusely stained positively.

HALL'S BILIRUBIN STAIN. SLIDE AK. LIVER: Brown granules within the hepatic cytoplasm stained negatively.

PRUSSIAN BLUE HISTOCHEMICAL REACTION FOR IRON. SLIDES AH, AK. LIVER: Brown granules within the hepatic cytoplasm stained negatively.

SLIDES L, M & AM. LUNG: There are no iron granules within alveolar macrophages.

PERIODIC ACID SCHIFF STAIN. SLIDE BB. BRAIN: Neurons have PAS positive granules within the cytoplasm.

SLIDE V. KIDNEY: There was no thickening of the basement membranes of glomeruli or tubules.
SLIDE AK. LIVER: There were rare positively staining granules within vacuolated hepatocytes.

MASSON'S TRICHOME STAIN. SLIDES B, C, & AN . HEART: There were multifocal regions of fibrosis closely associated with the atrioventricular valves.

AMYLOID RED STAIN. SLIDE Z. PANCREAS: No amyloid within pancreatic islets.

N. Tocco, DVM; Veterinary Pathology Resident
N. Mishra, BVSc, MVSc, MS, PhD, DACVP; Veterinary Pathologist

Preliminary Report: 2/15/2022

Final Report: 4/20/2022

-----END OF REPORT-----



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Accession No: 22 - 310
PRELIMINARY REPORT

ANDERSON, DR. CHELSEA
MYSTIC AQUARIUM
55 COOGAN BLVD
MYSTIC CT 06355

Date Collected: 2/11/2022
Date Submitted: 2/11/2022
Date Reported: 2/15/2022

PH: 860-572-5955 FAX: 860 - 572-5972

Animal ID:	Species:	Breed:	Sex:	Age:	Wt:
Havana	Marine	Beluga	F	6Y	377 kg

FINAL DIAGNOSIS:
PENDING

MORPHOLOGIC DIAGNOSIS:

LUNGS: edema, diffuse, severe, with mottled congestion
PERICARDIUM: fibrinous pericarditis, multifocal, marked
HEART: [1] bilateral atrioventricular endocardiosis, mild
LIVER: centrilobular congestion (presumed), diffuse, marked
KIDNEYS: bilateral congestion, marked
STOMACH (2ND COMPARTMENT): transmural edema, and mucosal congestion, diffuse, marked

COMMENTS:

There were multiple significant gross anatomic lesions in this beluga, particularly within the thoracic cavity. The lungs were severely edematous and congested, of which differentials for this change include but are not limited to bacterial infections and fungal infections. Samples and swabs of lung were submitted for aerobic bacterial culture and fungal, which is pending. The heart had apparent epicardial edema and atrioventricular endocardiosis. The second gastric compartment had marked mucosal congestion and edema. Samples of stomach were submitted for aerobic and anaerobic culture, which is also pending. Lesions to explain the previously reported neurologic or ocular disease were not identified, however swabs of the lateral ventricle were submitted for aerobic and anaerobic culture, which is also pending. Renal congestion could be interpreted as an agonal change. Tissues were submitted for histologic examination, which is also pending.

PATHOLOGIC FINDINGS

GROSS FINDINGS:

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HISTOPATHOLOGY:
PENDING

N. Tocco, DVM; Veterinary Pathology Resident
N. Mishra, BVSc, MVSc, MS, PhD, DACVP; Veterinary Pathologist

PENDING TESTS:

Culture-Pathology Aerobic
Fungal Culture
Culture-Pathology Anaerobic

Preliminary Report: 2/15/2022

-----END OF REPORT-----



NIMM Inventory NOAA Service Account nimm.inventory@noaa.gov

Additional clarification: Havana cause of death

NIMM Inventory - NOAA Service Account <nimm.inventory@noaa.gov>

Tue, Aug 15, 2023 at 10:38 AM

To: Allison Tuttle <atuttle@mysticaquarium.org>

Cc: Gayle Sirpenski <gsirpenski@mysticaquarium.org>, Amy Sloan - NOAA Federal <amy.sloan@noaa.gov>

Thank you for clarifying, Allison. We look forward to hearing final results.

Thank you,
Courtney.

On Tue, Aug 15, 2023 at 6:34 AM Allison Tuttle <atuttle@mysticaquarium.org> wrote:

Hi Courtney,

There are many forms of storage disease. Havana's is presently not categorized and requires additional study, which is being done at the University of Connecticut.

The pathologists have indicated that results are still in progress. We will relay the findings when we receive them.

Regards,

Allison

From: NIMM Inventory - NOAA Service Account <nimm.inventory@noaa.gov>

Sent: Monday, August 14, 2023 3:48 PM

To: Gayle Sirpenski <gsirpenski@mysticaquarium.org>

Cc: Allison Tuttle <atuttle@mysticaquarium.org>; Amy Sloan - NOAA Federal <amy.sloan@noaa.gov>

Subject: Additional clarification: Havana cause of death

EXTERNAL: This email originated outside of Mystic Aquarium. **USE CAUTION** when clicking on links or attachments unless the sender is known and the content is anticipated.

Good afternoon,

We recently learned there are at least two forms of storage disease (lysosomal and glycogen) and wanted to clarify which form Havana was inflicted with. Based on the description in the final histopathology report it appears she died from lysosomal storage disease. Is this correct?

Much thanks,

Courtney

On Thu, Jun 16, 2022 at 11 10 AM NIMM Inventory NOAA Service Account nimm.inventory@noaa.gov wrote

Good morning,

The National Inventory of Marine Mammals (NIMM) database has been updated with the final cause of death for beluga whale (*Delphinapterus leucas*) "Havana" (XDL11/NOA0010675). Attached for your files is the final Marine Mammal Data Sheet (MMDS) for this animal, with details as provided by Mystic. Please review and let us know if the information is incorrect.

If you have any questions regarding the NIMM, reporting requirements, or would like to request inventory information, please contact our Office via return email or by phone (301) 427-8401.

Sincerely,

Courtney

On Tue, May 10, 2022 at 10 35 AM Gayle Sirpenski gsirpenski@mysticaquarium.org wrote

Good morning ~

Attached please see the final MMDS for "Havana" NOA0010675 with the cause of death included. The histology report was previously submitted by Dr. Tuttle.

Please let me know if you need anything else.

Best,

Gayle

From: NIMM Inventory - NOAA Service Account <nimm.inventory@noaa.gov>

Sent: Tuesday, March 22, 2022 6:28 PM

To: Gayle Sirpenski <gsirpenski@mysticaquarium.org>

Cc: Allison Tuttle <atuttle@mysticaquarium.org>; Steve Coan <scoan@mysticaquarium.org>; Tracy Romano <tromano@mysticaquarium.org>; McKinnie, Carolyn - APHIS <carolyn.j.mckinnie@usda.gov>; Amy Sloan - NOAA Federal <amy.sloan@noaa.gov>

Subject: Re: Updated MMDS

EXTERNAL: This email originated outside of Mystic Aquarium. **USE CAUTION** when clicking on links or attachments unless the sender is known and the content is anticipated.

Dear Gayle,

Thank you for notifying us of the change concerning the marine mammals in Mystic Aquarium's custody. In accordance with Condition F.1.c of MMPA Permit No. 22629, the National Inventory of Marine Mammals (NIMM) database has been updated with the death of one beluga whale (*Delphinapterus leucas*, NOA0010685, XDL11, "Havana"). Attached for your files is the preliminary Marine Mammal Data Sheet (MMDS) for this animal. Note that the cause of death on the sheet is recorded as 'undetermined' with additional comments, as provided by Mystic. Please forward the cause of death to this Office, once it has been determined. In addition, a copy of the histopathology and any other relevant reports must be submitted when available (see also Condition B.6.k.ii of the permit). An updated MMDS will be provided to you when we are notified of a final cause of death.

If you have any questions regarding the NIMM, reporting requirements, or would like to request inventory information, please contact our Office via return email or by phone (301) 427-8401.

Best,

Courtney

On Tue, Mar 8, 2022 at 8:37 AM Gayle Sirpenski <gsirpenski@mysticaquarium.org> wrote:

Good morning Courtney and Jennifer ~

Attached is the preliminary MMDS for female beluga whale Havana. The final pathology report is still pending so the COD has not been determined. I'll send an updated MMDS with the pathology report as soon as it is available

Hope all is well

Best,

Gayle

Gayle Sirpenski

Animal Management Specialist

55 Coogan Boulevard

Mystic, Connecticut 06355

Phone | 860 572 5955 Ext 108

Cell | [REDACTED]

www.mysticaquarium.org



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Jennifer Skidmore and Courtney Smith, Ph.D.

Administrators
National Inventory of Marine Mammals (NIMM)

NOAA Fisheries, Office of Protected Resources
Permits and Conservation Division
Phone 301 427 8401
Fax: 301-713-0376

Contact: jennifer.skidmore@noaa.gov

Contact: courtney.smith@noaa.gov

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Jennifer Skidmore and Courtney Smith, Ph.D.

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Administrators
National Inventory of Marine Mammals (NIMM)

NOAA Fisheries, Office of Protected Resources
Permits and Conservation Division

10/6/23, 10:04 AM

National Oceanic and Atmospheric Administration Mail - Additional clarification: Havana cause of death

Phone 301 427 8401

Fax: 301-713-0376

Contact: jennifer.skidmore@noaa.gov

Contact: courtney.smith@noaa.gov

Sent from my Verizon, Samsung Galaxy smartphone
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Jennifer Skidmore and Courtney Smith, Ph.D.
Administrators

National Inventory of Marine Mammals (NIMM)

NOAA Fisheries, Office of Protected Resources

Permits and Conservation Division

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Contact: courtney.smith@noaa.gov