

DIAGNOSTIC CASE REPORT

U. S. GEOLOGICAL SURVEY-BIOLOGICAL RESOURCES DIVISION
NATIONAL WILDLIFE HEALTH CENTER-HONOLULU FIELD STATION
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Case Number: 25778

Submitter Name:

Dr. Summer Martin
National Oceanic and Atmospheric
Administration
1845 Wasp Blvd Bldg 176
Honolulu, Hawaii 96818
United States

Species submitted (n):

Turtle: Green (5)

SPECIMENS SUBMITTED: Carcass-Frozen

These five green turtles were found at Kukio Bay between 19-26 March. There were several eyewitness reports of monk seal(s) interacting with sea turtles in the area around the times of mortalities.

Acc	Date_Coll	Sex	TagNo	Diagnosis
1	3/19/2021	Female	20210319HAST1	Undetermined
2	3/19/2021	Female	20210319HAST2	Trauma
3	3/26/2021	Male	20210326HAST1	Trauma
4	3/20/2021	Female	20210320HAST2	Trauma
5	3/20/2021	Male	20210320HAST1	Trauma

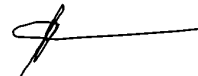
Comments: All turtles were in fair body condition and presented with a common set of findings comprising erosion of skin of dorsal and ventral front flippers sometimes extending to ablation of portions of caudal margins of front flippers and sometimes accompanied by erosion of eyelid skin. Three turtles had collapsed lungs suggesting they died from forced submergence. Microscopy revealed various degrees of trauma to the skin with little to no inflammation but evidence of regeneration (wound repair). 2/3 of the turtles with collapsed lungs had microscopic changes in the lungs similar to what we see in longline turtles with forced submergence.

Management: Monk seals interacting with turtles is not uncommon, and several videos are available on youtube. The lesions in the front flippers were not compatible with fishing line entanglement, so that is not the likely cause of forced submergence at least for the 3 turtles with collapsed lungs. Gross and microscopic pathology did not show evidence of infectious disease or other causes of death. Given that seals do manipulate turtles by their front flippers, the possibility that these mortalities are due to monk seal induced trauma and/or forced submergence seems a reasonable conjecture for at least 4 of the turtles. Whether this type of interaction needs to be managed remains open to question and is a decision left to management agencies.

Report Date (mm/dd/yyyy): 5/11/2021

Necropsy report: Enclosed

Copies of this report sent to:



If you have questions regarding this case, contact Thierry M. Work MS, DVM, MPVM at 808-792-9520. Include above Case Number. Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

NOTE: Information in this report supersedes any information from previous reports regarding this case .

**NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT**

Submitter Name:

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1845 Wasp Blvd Bldg 176
Honolulu, Hawaii 96818
United States

Case: 25778
Accession: 1
Date Collected: 3/19/2021
Date Examined: 4/5/2021
Prosector: T. M. Work
Pathologist: T. M. Work

Signalment-Morphometrics-History

CONDITION: (Fair) POSTMORTEM: (Good) EUTHANASIA: (Lethal injection)
TAG TYPE: (Other band) TAG NO.: (20210319HAST1)
SPECIES: (Turtle: Green) AGE: (Immature) SEX: (Female)
MORPHOMETRICS: Weight carcass (6.3 kg), Straight carapace length (39.5 cm).

COLLECTION-SITE: (Kukio Bay) AREA: (Hawaii) STATE: (Hawaii) COUNTRY: (United States)

HISTORY: This turtle was found alive on Kukio Bay beach but was totally lethargic with injuries to the front flippers. It was shipped to Oahu on 20 March 2021 and was euthanized after examination determined that recovery was unlikely. Following is history from Marc Rice: Date: 03/19/21 Location: Kukio Bay, Hawaii Island, Hawaii Time: 1100 h Personnel from Kukio called to inform me that there was a small turtle stranded/basking that did not react when moved or picked up... alive but totally lethargic. I proceeded to get equipment and go down to check it out. I picked up the turtle at 1216 h and transported it back to Waimea. I will keep it overnight and take it to the airport tomorrow morning at 0700 h for transport via HI Airlines to Oahu. Species: Cm SCL= ~40 cm Location at time of recovery: Lat: 19.818836 Long: -1560006589 Animal was minimally responsive with no apparent recent injuries. Both front flippers has similar sections missing and healing. Total distance traveled to effect recovery = 64 miles Total time: 2.5 hours (Not including transport to airport) 3/20/21 - transported turtle to Kona Airport in an animal carrier and left it with the HI Airlines Cargo folks at 0745 h, 3/20/21... Flight 177. Total Time (airport run) 2 h, Distance = 75 miles Cumulative time for recovery and total distance = 4.5 h and 139 miles.

External/Internal

EXTERNAL: There are healed lacerations on the caudal margins of both front flippers. There are old ulcerations on the cranial eye lids.

INTERNAL: The GI tract is full of algae.

PRELIMINARY DIAGNOSIS: Euthanasia.

Samples

SECIMENS RECEIVED: Carcass-Frozen.

HISTO: Spleen, Heart (A); Liver, Kidney (B); Heart (C); Lung (D); Skin (E); Skin (F); Skin (G).

Laboratory Results

HISTOPATHOLOGY

Skin: Flipper (E), Left (F) and right (G) eyelid. In one section (E), there are localized areas of vacuolation of basal cells.

Kidney: Rare trematode eggs are present.

Spleen: Occasional trematode eggs are present.

All other Organs: No remarkable lesions are seen.

COMMENTS:None

Final Diagnosis (in order of importance)

Diagnosis	Topog	Morpho	Etiol	Funct	Dis	Link
1. Undetermined	(T00010)	()	(E00040)	(FY3500)	()	()

Diagnostic findings may not be published without the knowledge and consent of the pathologist. Milt Code: (Open)

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Case: 25778
Accession: 2
Date Collected: 3/19/2021
Date Examined: 4/5/2021
Prosector: T. M. Work
Pathologist: T. M. Work

Signalment-Morphometrics-History

CONDITION: (Fair) POSTMORTEM: (Good) EUTHANASIA: (Not euthanized)
TAG TYPE: (Other band) TAG NO.: (20210319HAST2)
SPECIES: (Turtle: Green) AGE: (Immature) SEX: (Female)
MORPHOMETRICS: Weight carcass (9.7 kg), Straight carapace length (42.0 cm).
COLLECTION-SITE: (Kukio Bay) AREA: (Hawaii) STATE: (Hawaii) COUNTRY: (United States)
HISTORY: This turtle was found dead on Kukio Bay beach with eye injuries on 19 March 2021. History from Marc Rice: Date: 03/19/21 Location: Kukio Bay, Hawaii Island, Hawaii Time: 1400 h At 1403 hours, Puaita (same guy that reported the live turtle reported that they had recovered a second turtle of similar size that was dead. The turtle was found on the beach within 50 meters of the live turtle picked up 2 hours earlier. Pictures show emaciation similar to the other turtle (EC 1).. Pictures included. Interesting that there are injuries to the eyes that appear to be similar to the other turtle... maybe there is something you can look at in terms of entanglement or? Species: Cm SCL= 41.7 cm Location at time of recovery: Lat: 19.818836 Long: -1560006589

External/Internal

EXTERNAL: There is hyperemia of caudal front flippers. Puncture wounds are found on the cranial eyelids. There is linear abrasion on the top of the head.

INTERNAL: The right kidney appears hemorrhagic. There is hyperemia of the duodenal serosa. The GI tract is full of algae.

PRELIMINARY DIAGNOSIS: Forced submergence.

Samples

SECIMENS RECEIVED: Carcass-Frozen.

HISTO: Spleen, Heart (A); Liver, Kidney, Heart (B); Heart (C); Lung (D); Pancreas, Intestine small (E); Skin (F); Skin (G); Skin (H); Skin (I).

Laboratory Results

HISTOPATHOLOGY

Heart: Occasional clusters of trematode eggs are present.

Skin: Left (F), right (G) eye, left (H), right (I) flipper. In some sections (F, H), there are segmental areas of epidermal ulceration. In another section (G), there are diffuse areas of epidermal ulceration with epidermal regeneration, and in intact

skin, segmental areas of epidermis manifest intranuclear vacuolation with cleft formation.

Intestine small: A larval metazoan (trematode) surrounded by macrophages is within smooth muscle wall.

Lung: Rare trematode eggs are within smooth muscle.

All other Organs: No remarkable lesions are seen.

COMMENTS:None

Final Diagnosis (in order of importance)

Diagnosis	Topog	Morpho	Etiol	Funct	Dis	Link
1. Trauma	(T10050)	(M10000)	(E90020)	()	()	()

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Milt Code: (Trauma)

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Case: 25778
Accession: 3
Date Collected: 3/26/2021
Date Examined: 4/5/2021
Prosector: T. M. Work
Pathologist: T. M. Work

Signalment-Morphometrics-History

CONDITION: (Fair) POSTMORTEM: (Good) EUTHANASIA: (Not euthanized)

TAG TYPE: (Reference Number) TAG NO.: (20210326HAST1)

SPECIES: (Turtle: Green) AGE: (Immature) SEX: (Male)

MORPHOMETRICS: Weight carcass (7.2 kg), Straight carapace length (39.5 cm).

COLLECTION-SITE: (Kukio Bay) AREA: (Hawaii) STATE: (Hawaii) COUNTRY: (United States)

HISTORY: This turtle was found unresponsive and floating in the water off Kukio Bay Beach on 26 March 2021. It was taken to shore barely alive and died later that evening. History from Marc Rice: Date: 03/20/21 Location: Kukio Bay, Hawaii Island, Hawaii Time: 1000 h At 1000 hours, security reported that they had recovered a second dead turtle for the waters in front of the beach. Pictures included. Interesting that there are injuries to the eyes and left and right front flippers that appear to be similar to the other turtle. Species: Cm SCL= 43 cm Location at time of recovery: Lat: 19.818647° Long: -155.998715°

External/Internal

EXTERNAL: The dorsal caudal margin scales are ragged on both front flippers.

INTERNAL: There is bruising of the right pectoral muscle. The lungs appear collapsed. There is bruising on the crop.

PRELIMINARY DIAGNOSIS: Forced submergence.

Samples

SECIMENS RECEIVED: Carcass-Frozen.

HISTO: Spleen, Heart (A); Liver, Kidney (B); Lung (C); Skin (D); Skin (E); Skin (F); Skin (G); Skin (H).

Laboratory Results

HISTOPATHOLOGY

Skin: Left (E), right (F) eye, left (G), right (H) flipper. In two section (E,H), there are diffuse areas of epidermal ulceration with dermis overlaid by necrotic debris. In another section (F), are trematodes within dermis surrounded by fibroblasts and scattered trematode eggs. In another section (G), there are diffuse areas of coagulation necrosis of dermis and epidermis.

Lung: Small numbers of trematode eggs surrounded by giant cells are within smooth muscle walls.

Spleen: Moderate numbers of trematode eggs are scattered throughout some associated with deposition of brown pigment.

All other Organs: No remarkable lesions are seen.

COMMENTS:None

Final Diagnosis (in order of importance)

Diagnosis	Topog	Morpho	Etiol	Funct	Dis	Link
1. Trauma	(T10050)	(M10000)	(E90020)	()	()	()
2. Forced submergence suspect	()	()	()	(FY2220)	()	(SP)

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Milt Code: (Trauma)

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Case: 25778
Accession: 4
Date Collected: 3/20/2021
Date Examined: 4/5/2021
Prosector: T. M. Work
Pathologist: T. M. Work

Signalment-Morphometrics-History

CONDITION: (Fair) POSTMORTEM: (Good) EUTHANASIA: (Not euthanized)
TAG TYPE: (Reference Number) TAG NO.: (20210320HAST2)
SPECIES: (Turtle: Green) AGE: (Immature) SEX: (Female)
MORPHOMETRICS: Weight carcass (12.4 kg), Straight carapace length (47.5 cm).
COLLECTION-SITE: (Kukio Bay) AREA: (Hawaii) STATE: (Hawaii) COUNTRY: (United States)
HISTORY: This turtle was found dead on the ocean floor at a depth of 10 feet at Kukio Bay on 20 March 2021. History from Marc Rice: Date: 03/20/21 Location: Kukio Bay, Hawaii Island, Hawaii Time: 1200 h At 1200 hours, security reported that they had recovered a third dead turtle for the waters in front of the beach. It was found laying on the bottom in 10 feet of water. Pictures included. Interesting that there are injuries to the eyes and left and right front flippers that appear to be similar to the other turtles. Species: Cm SCL= 50 cm Location at time of recovery: Lat: 19.818876° Long: -155.998950° Total Time 2:15 h, Distance = 73 miles

External/Internal

EXTERNAL: Both front flippers have a ragged loss of dorsal caudal scales.

INTERNAL: The lungs appear collapsed. The GI tract is full of algae.

PRELIMINARY DIAGNOSIS: Forced submergence.

Samples

SECIMENS RECEIVED: Carcass-Frozen.

HISTO: Heart, Liver, Spleen (A); Heart (B); Kidney (C); Lung (D); Skin (E); Skin (F); Skin (G); Skin (H).

Laboratory Results

HISTOPATHOLOGY

Skin: left (E), right (F) eye and left (G) and right (H) flipper. In one section (E,G), there is diffuse coagulation necrosis of dermis and ulceration of epidermis. In another section (F,H), there is localized to diffuse ulceration of epidermis with what appears to be attempts at reepithelialization.

Lung: Segmentally, there is accumulation of homogenous pink material in lumen and wall of small airways (edema).

All other Organs: No remarkable lesions are seen.

COMMENTS:None

Final Diagnosis (in order of importance)

Diagnosis	Topog	Morpho	Etiol	Funct	Dis	Link
1. Trauma	(T10050)	(M10000)	(E90020)	()	()	()
2. Forced submergence suspect	()	()	()	(FY2220)	()	(SP)

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Milt Code: (Trauma)

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Case: 25778
Accession: 5
Date Collected: 3/20/2021
Date Examined: 4/5/2021
Prosector: T. M. Work
Pathologist: T. M. Work

Signalment-Morphometrics-History

CONDITION: (Fair) POSTMORTEM: (Good) EUTHANASIA: (Not euthanized)
TAG TYPE: (Reference Number) TAG NO.: (20210320HAST1)
SPECIES: (Turtle: Green) AGE: (Immature) SEX: (Male)
MORPHOMETRICS: Weight carcass (8.2 kg), Straight carapace length (40.4 cm).

COLLECTION-SITE: (Kukio Bay) AREA: (Hawaii) STATE: (Hawaii) COUNTRY: (United States)

HISTORY: This turtle was found dead on the beach with eye and front flipper injuries at Kukio Bay on 20 March 2021. History from Marc Rice: Injured turtle call: Call from Kukio at 1049 that they had another small turtle. It was found floating basically unresponsive in the water just off the beach and was retrieved by one of the beachboys. It was alive but barely. I left home at 1215 h and got to Kukio at 1300. Picked up turtle from the beach shack and placed it in gray box for transport back to waimea. Arrived in Waimea at 1400 h. Date: 3/26/21 Time: 1015 h recovered from water Location: Kukio Bay, Hawaii Island lat= 19.818760° Long= -155.998826° species - Cm CCL = 41 cm EC = 2.5 Injuries to left and right front flippers similar to other three... They were pretty well chewed up.. attributed to HMS caused injuries by RA20. There were no apparent injuries to the eyes. NOTE: the turtle died at approximately 1800 hours on 3/26/21 and has been placed in the HPA freezer. Total Time (airport run) 1:47 h 63 miles Cumulative time for recovery for turtle 5 and shipping of 4 turtles via Fedex = 4:15 h

External/Internal

EXTERNAL: There is ragged loss of caudal dorsal scales on both front flippers. There is a small hole on the right side of the head.

INTERNAL: The lungs appear collapsed. There is bruising of the crop mucosa and serosa. The crop is full of algae.

PRELIMINARY DIAGNOSIS: Forced submergence.

Samples

SECIMENS RECEIVED: Carcass-Frozen.

HISTO: Heart, Liver, Spleen (A); Pancreas, Kidney (B); Lung (C); Skin (D); Skin (E); Skin (F); Skin (G); Skin (H).

Laboratory Results

HISTOPATHOLOGY

Lung: Localized areas of airways are filled with homogenous eosinophilic material.

Skin: Unknown location (D), left (E), right (F) eye and left (G), right (H) flipper. In one section (D), there is diffuse intranuclear vacuolation of epidermal cells along with segmental cleft formation between dermis and epidermis. A localized area of diffuse epidermal ulceration is present. In another section (H), there are localized areas of ulceration with foci of what appears to be re-epithelialization.

All other Organs: No remarkable lesions are seen.

COMMENTS:None

Final Diagnosis (in order of importance)

Diagnosis	Topog	Morpho	Etiol	Funct	Dis	Link
1. Trauma	(T10050)	(M10000)	(E90020)	()	()	()
2. Forced submergence suspect	()	()	()	(FY2220)	()	(SP)

Diagnostic findings may not be published without the knowledge and consent of the pathologist. Milt Code: (Trauma)