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*Western Painted Turtle (Chrysemys picta bellii)*  
Photo by ZooMed  
See centerfold on pages 26-27

## *Turtle Issue*

Volume 10, Number 3  
Third Quarter, 2016



**WHO ARE WE**

**The mission** of the World Aquatic Veterinary Medical Association is to serve the discipline of aquatic veterinary medicine in enhancing aquatic animal health and welfare, public health, and seafood safety, in support of the veterinary profession, aquatic animal owners and industries, and other stakeholders.

**The purpose** of the World Aquatic Veterinary Medical Association is:

- To serve aquatic veterinary medicine practitioners of many disciplines and backgrounds by developing programs to support and promote our members, and the aquatic species and industries that they serve.
- To identify, foster and strengthen professional interactions among aquatic medical practitioners and other organizations around the world.
- To be an advocate for, develop guidance on, and promote the advancement of the science, ethics and professional aspects of aquatic animal medicine within the veterinary profession and a wider audience.
- To optimally position and advance the discipline of aquatic veterinary medicine, and support the practice of aquatic veterinary medicine in all countries.

*The ideas presented in this publication express the views and opinions of the authors, may not reflect the view of WAVMA, and should not be implied as WAVMA recommendations or endorsements unless explicitly stated.*

*Information related to the practice of veterinary medicine should only be used within an established valid Veterinarian-Patient-Client Relationship.*



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**Editorial Staff**

Nick Saint-Erne (USA) [TAVeditor@wavma.org](mailto:TAVeditor@wavma.org)  
*Executive Editor*

*Communications Committee:*

Andrei Bordeianu (France)

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**WAVMA Executive Board**

Nick Saint-Erne (USA) [President@wavma.org](mailto:President@wavma.org)  
*President*

Laura Urdes (Romania) [laurau\\_2005@yahoo.com](mailto:laurau_2005@yahoo.com)  
*President-Elect*

Chris Walster (UK) [chris.walster@onlinevets.co.uk](mailto:chris.walster@onlinevets.co.uk)  
*Immediate Past President*

Devon Dublin (Japan) [Secretary@wavma.org](mailto:Secretary@wavma.org)  
*Secretary*

Sharon Tiberio (USA) [Treasurer@wavma.org](mailto:Treasurer@wavma.org)  
*Treasurer*

Chad Harris (USA) [caharris24@yahoo.com](mailto:caharris24@yahoo.com)  
*Director-at-Large*

Stephen Reichley (USA) [stephen.reichley@gmail.com](mailto:stephen.reichley@gmail.com)  
*Director-at-Large*

Richmond Loh (Australia) [thefishvet@gmail.com](mailto:thefishvet@gmail.com)  
*Director-at-Large*

*Non-voting Advisors:*

Julius Tepper (USA) [cypcarpio@aol.com](mailto:cypcarpio@aol.com)  
*Fellowship Advisory Council*

David Scarfe (USA) [Parliamentarian@wavma.org](mailto:Parliamentarian@wavma.org)  
*Parliamentarian*

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Dr Mohamed Faisal (USA) 2013

Dr Richmond Loh (Australia) 2014

Dr Chris Walster (UK) 2015

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Chris Walster, Secretary 2007-2013

Dusan Palic, Treasurer 2007-2010

Nick Saint-Erne, Treasurer 2011-2014

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**Editor’s Note**

This issue is mostly about turtles. As veterinarians, we typically separate turtles (water dwelling chelonians) from tortoises (land dwelling chelonians), although many people commonly use ‘turtles’ to refer to either. There are also ‘terrapins’, which are fresh water turtles. According to Wikipedia, “Turtles are reptiles of the order Testudines (or Chelonii) characterised by a special bony or cartilaginous shell developed from their ribs and acting as a shield. ‘Turtle’ may refer to the order as a whole (American English) or to freshwater and sea-dwelling testudines (British English).”

<https://en.wikipedia.org/wiki/Turtle>

There are 327 known species of Chelonians alive today, and many are highly endangered because of habitat destruction, encroachment of developments and roadways, capture for food and for pets and other forms of predation, and, in the case of sea turtles, plastics and other pollutants in the sea. As aquatic veterinarians, it is our role to help these animals, whether to preserve them in the wild, ensure their health in farms where they are raised for food (over 1000 turtle farms are reported to be raising turtles for food in China), and educate our clients on the proper care, habitat and nutrition for their pet turtles and tortoises.

My first pet, when I was 6 years old growing up in Kansas, was a box turtle my father found on the road and brought home. For the rest of my childhood, I had box turtles as pets, and still have some today, along with other species of water turtles and tortoises. These long lived pets are relatively easy to care for, have individual personalities, can certainly recognize different people, come when they are called, and like to be scratched on the head and neck [well, not all species of turtles - do not try that with snapping turtles!].

As aquatic vets, we need to keep in mind these wonderful aquatic (and land) creatures that need our care too!

**Nick Saint-Erne,**  
DVM, CertAqV  
Executive Editor  
[TAVeditor@wavma.org](mailto:TAVeditor@wavma.org)

*Sporting my  
Hawaii Sea Turtle  
shirt at  
Lake Havasu,  
Arizona*



Download a QR reader onto your Smart Phone and scan the Quick Response Code to the right. It will take you to the WAVMA.org website page for accessing all of the past WAVMA Newsletters.



You will need your WAVMA User ID and Password to access the most recent issues of *The Aquatic Veterinarian*.

**Cover Photo:**



**Western Painted Turtle** (*Chrysemys picta bellii*)  
Photo by ZooMed  
See centerfold on pages 26-27

*The Aquatic Veterinarian*

**The Quarterly Magazine of the  
World Aquatic Veterinary Medical Association**

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### President's Report

Following the theme of my previous President's Reports, I will review the history of WAVMA through the archive of the President's Reports of years past. The last two issues covered the first 5 years of WAVMA. I would like to bring the reader up to the beginning of the present year in this issue, and then reserve the next issue to reflect on 2016.

In *Aquatic Vet News* 6(1), 2012 President, Dusan Palic, expounded on the good work that was being done in improving our website ([WAVMA.org](http://WAVMA.org)), developing the Certified Aquatic Veterinarian Program, and creating the Distinguished Fellows program. WAVMA had joined the World Small Animal Veterinary Association in order to introduce ornamental fish to the small animal practitioners around the world. We also became members of the World Veterinary Association. Our 2012 Annual General Meeting was held in August in conjunction with the AVMA Convention in San Diego, California.

A milestone event in 2012 was our first WAVMA Webinar, "Structure and Function of Fish Gills," by Dr Rob Jones. His excellent program started one of our most remarkable WAVMA accomplishments, and we now have 28 webinars posted on our website: <https://www.wavma.org/WebCEPD>. These are FREE to watch and can be used for CEPD Credit.

Finally, at the end of 2012 it was announced that the Credentialing Committee had completed the Certified Aquatic Veterinarian Program documents and committee members would test it in 2013.

2013 started with a big change: *The Aquatic Vet News* newsletter transitioned into *The Aquatic Veterinarian* journal! Our WAVMA quarterly publication expanded in size and content, with a new cover design. 2013 President, Mohamed Faisal commissioned the cover design from the staff artist at the College of Veterinary Medicine at Michigan State University, where he teaches.

WAVMA created a FaceBook page and joined Linked-in, to spread the word about Aquatic Veterinary Medicine through social media. We had student members start Student Chapters of WAVMA at their Universities: Tuskegee University being the first and the University of Prince Edward Island, University of Tennessee, University of Wisconsin and University of Florida following.

We had a great WAVMA fish medicine wet-lab and 5 days of presentations at the AVMA Convention in Chicago, Illinois in July, 2013, then our Annual General Meeting was held at the World Veterinary Congress, sponsored by the WVA, in Prague in September, 2013. At that meeting, the first 11 Certified Aquatic Veterinarians were announced.

The year 2014 commenced with President Richmond Loh examining the areas we will concentrate on in the year ahead are:

1. Relevance: to satisfy the needs and wants of our members, through support, CEPD, recognition of prior experience and defending the aquatic area for the veterinary profession.
2. Pre-eminence: about growing the WAVMA brand within our profession (to our colleagues) and outside our profession (to our clients) by promoting the value and utilisation of suitably qualified aquatic veterinarians to our clients.
3. Reach: through the internet (social media) and engaging in open dialogue with other organisations.

Today, WAVMA continues to accomplish these goals through our WebCEPD programs, the CertAqV Program, this journal, and other content provided on our website and at veterinary meeting presentations given by WAVMA members. In 2014 we also joined the World Continuing Education Alliance to be able to share web-based CEPD content.

Our Annual General Meeting was held in July, in conjunction with the AVMA Convention, in Denver, Colorado. Once again, WAVMA presented lectures and a wet-lab at this conference. We finished the year with 23 Certified Aquatic Veterinarians, 12 WAVMA Student Chapters in veterinary schools around the world and an online WAVMA store where you can buy cool shirts and other WAVMA logoed items.

Last year (2015), President Chris Walster promised the year to be one of the best ever! And he was right!! WAVMA expanded our global reach, and certainly is nurturing the next generation of Aquatic Veterinarians, through our student chapters (14 now), scholarships (over \$42,000 in educational awards given) and educational programs. WAVMA presented programs at the International Veterinary Students Association conference in Romania, and WAVMA also became a member of the International Aquatic Veterinary Council.

WAVMA provided the Aquatic Medicine lectures at the WSAVA Congress in Bangkok, Thailand in May 2015. Our Annual General Meeting was held in September in Istanbul, Turkey in conjunction with the WVC. Laura Urdes, from the Communications Committee, started issuing monthly e-News updates about WAVMA. We also added Externship and Jobs postings on the WAVMA website. Throughout the year, Chris Walster worked with Vetstream to develop our first ever Online Virtual Conference, which was held in May of 2016. More about 2016 in the next issue!

**Nick Saint-Erne, DVM, CertAqV**  
WAVMA President  
[President@wavma.org](mailto:President@wavma.org)  
[nsainterne@gmail.com](mailto:nsainterne@gmail.com)  
Phoenix, AZ USA

## Secretary's Report

Dear WAVMA members,

We are fast approaching the end of the year and 2016 is certainly a year to be remembered. Allow me to express gratitude to those of the members that participated in the recently held elections, both as office bearers for the year 2017 as well as those that casted their ballot. As secretary, with a renewed tenure I am indeed pleased to continue contributing to advancing the work of WAVMA. I wish to congratulate all those that have been elected and it is certainly a breath of fresh air to once again have a female president that will take up the mandate in January 2017.

WAVMA continues to serve its members by providing the benefits that are offered, but we are working assiduously to improve what we have started while forging new partnerships as well. The WAVMA Certified Aquatic Veterinarian program continues to attract a large number of persons and the support from those that function as mentors must be acknowledged and recognized.

In addition to the regular *Web-CEPD*, *PubCEPD* and the *Clinical Corner*, there was the hosting for the first time of a virtual conference. This is an area that WAVMA would like to build on and in the near future, those lectures will be available to all members.

WAVMA will continue to be a good collaborator with other organizations, WVA and WSAVA being the most notable ones to expand the reach of information and capacity building in the area of aquatic veterinary medicine. Members are encouraged to take advantage of the benefits that are derived from our affiliation with these organizations and assist us in fulfilling our mandate in this regard, such as providing information that may be solicited from time to time by means of surveys etc.

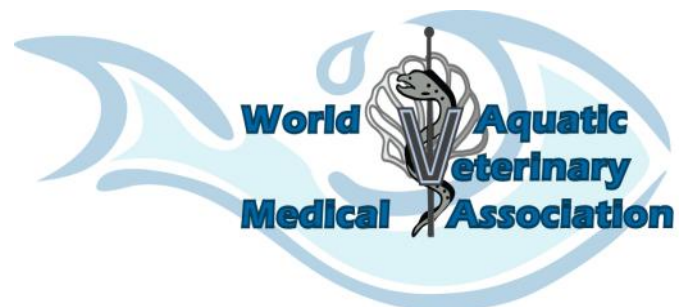
We are constantly exploring ways of improving and increasing the quality of service to members as well as the types of benefits. We would like to improve and expand on our picture and video libraries, which can serve as a valuable resource for use in presentations and such. In addition, the website will be continuously improved over time. We therefore appeal to members to send us suggestions on how things can be improved and also new ideas that the board may be able to act on to make the experience of our members better.

The Student membership is continuously rising and as such we would like to focus our energies on that category of our members in a special way while working side by side with the Student's Committee. In the same breath, allow me to thank those that are contributing to the continuity of the educational grants offered under the Pitts Education Award Program.

Around this time last year, I had made an appeal for our members to consider serving as an Officer, Director or Committee Member on the executive board or one of the committees (Certification, Communications, Meetings, Membership, Students). I wish to thank two relatively new faces who will be sitting on the board for 2017, and they are Dr. Howard Wong (Hong Kong/China) and Dr. Trista Welsh (USA). I wish them well and hope that others would also follow suit in the future, since new persons bring with them fresh ideas.

Let us continue to work together to advance the vision of WAVMA and serve as credible advocates for adequate and efficient aquatic veterinary care and service.

**Devon Dublin, DMVZ, MSc. CertAqV**  
WAVMA Secretary  
Global Environment Facility - Satoyama Project  
6-7-1-507 Conservation International Japan,  
Shinjuku, Tokyo,  
160-0022, Japan  
[Secretary@wavma.org](mailto:Secretary@wavma.org)



**Treasurer’s Report**

Our income so far this year has exceeded our expenses, and we have had a record number of new members join WAVMA, which is our main source of income each year.

INCOME DETAILS	ACTUAL	BUDGETED
<i>Memberships</i>		
<i>Veterinarian</i>	13,000.00	11,000.00
<i>New Graduate</i>	1,000.00	500.00
<i>Vet Student</i>	4,600.00	5,000.00
<i>Vet Tech/Nurse</i>	150.00	100.00
<i>Affiliate (Non-vet)</i>	300.00	
<i>Allied Veterinary Organization</i>		
<i>Library</i>	200.00	

**New Members (3rd Quarter 2016)**

Members are the life-blood of any professional Association. Please join us in welcoming the following new WAVMA members:

**Full Members**

Andrea Marsella	Italy
Ayanna Carla Phillips	Trinidad and Tobago
Hossein Varshoie	Iran
Abdelnaser Bayoumy	United States
Antonella Fabrissin	Italy
Troye Myers	United States
Joey Kaletsch	United States
Ashley Emanuele	United States
Lisa Perez	United States
George Abernathy	United States
Paula Benner	United States
Elizabeth Braddon	Australia

**New Graduate Veterinarians**

Kyle DeYoung	United States
Johanna Mahadevan	Australia

**Vet Student Members**

Laura Taylor	Saint Kitts and Nevis
Elliott Antulov	Saint Kitts and Nevis
Caroline O’Connell	Ireland
Mitchell Larson	Saint Kitts and Nevis
Jennifer Volz	United States
Karen Cousins	Saint Kitts and Nevis
Alissa Tepedino	Saint Kitts and Nevis
Allison Marnette	Saint Kitts and Nevis
Daniel Prendiville	United States
Ashley Smith	Saint Kitts and Nevis
Nicole White	United States
Tara Becher	Saint Kitts and Nevis

Colleen Guilfoyle	United States
Lauren Woods	United States
Laura de Armas	United States
Gina Navia	United States
Shannon Snook	United States
Brittaney Blanco	United States
Wayne Tsang	United States
Summer Pepper	United States
Joey Cowan	United States
Farida Varias	United States
Spencer Feng	United States
Jolene Sun	United States
Kristen Bartholomew	United States
Katie Royer	United States
Anusia Nadarajan	Malaysia
Pamela May	United States
Christina Dover	United States
Katharine Hausmann	United States
Madeleine Hendrix	United States
Chelsea Hester	United States
Michelle Noga	Australia
Kyle Farmer	United States
Kirsten Lapuyade	United States
Katharine Onofryton	United States

**Veterinary Technicians/Nurses**

Sarah Hasty	United States
Iselin Evje	Norway

**Sharon Tiberio, DVM, CertAqV**

WAVMA Treasurer  
[Treasurer@wavma.org](mailto:Treasurer@wavma.org); [srtiberio@att.net](mailto:srtiberio@att.net)



### Election Results for 2017 Executive Board

Congratulations are in order for the following members who were elected to the WAVMA Executive Board for 2017:

#### President-Elect

##### David Scarfe (USA)

BSc (Zoology, 1969, University of Natal), Graduate Studies (Marine Biology, 1971, University of Cape Town), PhD (Biology, 1979, Texas A&M University), DVM (1986, Texas A&M University), Life Member of Royal Society of Southern Africa (1971), WAVMA Fellow (2009), Cert AqV(2013)



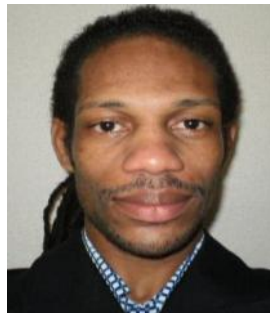
Vision and plans as an Executive Board Member: Having been involved with WAVMA since its inception in 2006, it is my hope to help WAVMA focus on existing and new priorities and programs for improving and expanding member programs, particularly:

1. Educational opportunities for members to earn CEPD credit and acquire basic, and advanced aquatic veterinary knowledge and skills, through in-person conferences, symposia and meetings, and web-based WebCEPD, PubCEPD, CertAqV, and other programs;
2. Establishing incentives encouraging more members to participate in committees to help refine and administer existing or new programs;
3. Open opportunities to encourage more veterinary organizations and veterinary schools to partner, collaborate or work with WAVMA to expand opportunities in aquatic veterinary medicine; and,
4. Open opportunities to encourage aquatic-orientated companies and organizations to sponsor and support WAVMA programs.

#### Secretary

##### Devon Dublin (Japan/Guyana)

Doctor in Veterinary Medicine and Zootechnics (summa cum laude), Agrarian University of Havana (UNAH), Cuba (2007); Masters in Marine Life Sciences, Hokkaido University, Japan (2012); PhD in Environmental Science Development at the Hokkaido University, Japan; WAVMA CertAqV.



Vision and plans as an Executive Board Member: I am committed to the work of WAVMA and believe that my tenure as a Director-at-Large and experi-

ence in the Communications Committee as well as Secretary gives me confidence in continuing the mandate of Secretary for another year. WAVMA has come a long way and I am happy to be a part of a pool of professionals that are committed to the advancement of Aquatic Veterinary Medicine. I am dedicated to the principles of the organization and do believe that WAVMA is extremely relevant in being a worldwide advocate and representative of the field of Aquatic veterinary medicine. I would like to see more involvement of regions outside of North America and Europe and would try to achieve this through my involvement in Regional groupings and contacts forged. I will also seek to advance the cause of WAVMA through the various means of communication at my disposal.

#### Treasurer

##### Sharon Tiberio (USA)

Bachelor of Science in Microbiology, University of Florida; Doctor of Veterinary Medicine, University of Florida; USDA/APHIS National Veterinary Accreditation Program, Category II; WAVMA Certified Aquatic Veterinarian.



Vision and plans as an Executive Board Member: Being a solo veterinary practice owner, I bring strong business skills to the position of WAVMA treasurer. Having served as WAVMA treasurer for 2015 and 2016, I've gained valuable experience in recognizing the issues and dynamics influencing successful operation of an education based nonprofit organization. I have acquired in-depth knowledge of the financial considerations driving the success of the programs and benefits WAVMA offers its membership, and enjoyed working in cooperation with the Board and committees in helping WAVMA achieve its goals and meet its objectives. In addition to executing the usual responsibilities associated with being treasurer, I administer the Student Chapter Educational Reimbursement program as well as disbursements for John Pitts Award recipients. I collaborated with our website administrator to improve efficiency and ease of use of WAVMA's online payment and renewal reminder system. I wish to support WAVMA through active participation, and look forward to fostering more friendships and professional liaisons with my new colleagues as WAVMA continues to grow.

#### Directors-at-Large (3):

##### Stephen Reichley (USA)

PhD, Aquatic Animal Health, expected 2017 (Mississippi State University, College of Veterinary Medicine); DVM, May 2013 (Ohio





State University, College of Veterinary Medicine); BS, Pre-Veterinary Medicine and Biology, Chemistry Minor, May 2009 (University of Findlay); WAVMA CertAqV.

Vision and plans as an Executive Board Member: One of my areas of focus as a young veterinarian is the involvement of students in WAVMA and their membership benefits. To this end, I have served as a member of the John L. Pitts Aquatic Veterinary Education Awards Program for the past three years, helping structure the Program and increase its brand awareness. The Program has had a tremendous impact on the profession, awarding \$42,500 to 65 veterinary students and veterinarians from around the world. I also serve as an advisory member of the WAVMA Student Committee, assisting in the development of new programs, including the WAVMA Mentor Program. As a member of the Communications Committee, I have helped reinvigorate WAVMA social media activity across Facebook, Twitter, and LinkedIn. Over the past year, we have experienced a 158% increase in Facebook Page likes and 318% increase in average post reach; 154% increase in LinkedIn followers; and 240% increase in Twitter followers. This increased social media activity has undoubtedly increased awareness of and interest in WAVMA. During my past year as a Director-at-Large, I helped develop the WAVMA Aquatic Veterinary Student Externship webpage, a useful tool matching veterinarians hosting externs with qualified veterinary students. I also helped create the WAVMA Student Chapter database allowing WAVMA to more closely track the activities and membership of its Student Chapters at universities around the world. I have been working diligently to help WAVMA take a more proactive role with the Chapters and I serve as a point of contact for them. Serving as a Director-at-Large this past year has been a terrific and humbling experience. I am honored to be working alongside some of the greatest aquatic veterinarians around the world and extremely generous and hardworking individuals. I have grown personally and professionally, expanding skill sets and widening my network of veterinarians globally. I hope to continue representing WAVMA members' interests and assisting the Board in identifying important issues related to aquatic veterinary medicine.

**Howard Wong** (Hong Kong, China) MA (Cambridge), MPVM (UC-Davis), VetMB. (Cambridge), MSc (Sustainable Aquaculture, St. Andrews).

Vision and plans as an Executive Board Member: The aquaculture industry is in desperate need of more veterinary input, both in terms of preventative fish health pro-



grammes and disease treatment but also aquatic research into nutrition, waste treatment, fish diseases, and improved husbandry and welfare, with a view to making aquaculture truly sustainable. I am very interested in promoting veterinary involvement in aquaculture and the need to improve basic veterinary education in aquatic health is fundamental to this goal. As the Executive Director of the School of Veterinary Medicine at CityUHK I am in a good position to spearhead veterinary education in aquatic health which is why we have developed a joint MSc with the University of Stirling and also why our School has placed Aquatic Health as one of the four main pillars of our veterinary degree programme. I would be happy to assist WAVMA in achieving these aims globally but especially in Asia where the vast majority of Aquaculture occurs. In my view, WAVMA needs a strong presence in Asia (especially China) if we are to have an influence on the next generation of veterinarians. I stand ready to assist WAVMA in its strategic goals but also to assist the association in any way possible, be it administrative or otherwise.

**Trista Welsh-Becker** (USA)

WAVMA Certified Aquatic Veterinarian; Doctor of Veterinary Medicine, University of Georgia; Master of Science, University of Alaska; Bachelor of Science in Wildlife, Humboldt State University.

Vision and plans as an Executive Board Member: As a recent recipient of the Certificate in Aquatic Veterinary Medicine from WAVMA, I look forward to helping this program grow and develop into a well-recognized certification program for entry-level fish veterinarians. I look forward to contributing as a mentor for future applicants and new veterinarians. As a government organization veterinarian, serving as an Executive Board Member will be a great way to remain involved in the veterinary profession and allow me to continue my public service by giving back to the organization. As aquaculture continues to grow both in the United States and worldwide, I can provide an expert viewpoint for fisheries veterinarians looking to develop their abilities in this area as well as provide insight on current and developing issues. As aquatic medicine grows, so too will the WAVMA and its reaches in the veterinary world. Providing direction to the organization as it looks to refine its focus and implement changing goals will be critical in continuing to maintain relevance, retain membership, and attract new members.



## PRIVILEGES & BENEFITS OF WAVMA MEMBERSHIP

### Aquatic Veterinary e-Learning

Supporting WAVMA's WebCEPD, PubCEPD  
CertAqV & Clinical Cases Programs.



- Enjoy on-line *e-Learning* programs & courses to advance your knowledge & skills
- Get continuing education credit through *Web-CEPD, PubCEPD & Clinical Corner*
- Discover core knowledge, skills & experience needed to become a WAVMA Certified Aquatic Veterinarian (*CertAqV*)
- Receive *discounted* subscriptions to publications & meetings
- Utilize WAVMA's *picture & video libraries* for your own presentations
- Join *listservs* to discuss clinical cases & other issues
- Mentor & be mentored to expand your and other's aquatic veterinary skills
- Publish your articles in WAVMA's quarterly journal: *The Aquatic Veterinarian*
- Find world-wide externships, internships, residencies & jobs in all aquatic vet areas
- Access *Member Directories* & have your Clinic/Hospital listed on-line
- Benefit from *Educational grants* for vet students & new veterinary graduates
- Form & participate in *veterinary school chapters* throughout the world
- Participate in veterinarian and client surveys
- Help build additional member programs by serving as an Officer, Director or Committee Member

### WAVMA Committees

As a member-driven organization, WAVMA relies on volunteers to help implement programs useful for all members. Any WAVMA member can volunteer on a Committee to help shape the direction of the Association, meet new colleagues, forge valuable and lasting relationships, and help address key issues affecting aquatic veterinary medicine today. To find out more about serving on a Committee, please contact the Committee Chair or the WAVMA Parliamentarian.

#### Budget and Finance Committee

This Committee develops and regularly revises the Association's annual budget and assists the Treasurer, as necessary, in developing the Association's annual financial reports and tax materials.

This Committee shall consist of the Treasurer (Chair); the President-Elect; and one other member of the Executive Board who will volunteer to serve a one-year renewable term.

Chair: Sharon Tiberio, [Treasurer@wavma.org](mailto:Treasurer@wavma.org)

#### Communications Committee

This Committee manages the communications among members and others involved with aquatic veterinary medicine. It oversees the listservs, membership lists, publication of WAVMA's quarterly journal *The Aquatic Veterinarian*, e-News, Facebook, Twitter, LinkedIn and other social media accounts.

Chair: Devon Dublin, [DevDub@yahoo.com](mailto:DevDub@yahoo.com)

#### Credentialing Committee

This Committee oversees and administers the Cert-AqV Program for credentialing aquatic veterinary practitioners, and evaluates aquatic veterinary educational programs useful to members.

Chair: Tim Miller-Morgan [tim.miller-morgan@oregonstate.edu](mailto:tim.miller-morgan@oregonstate.edu)

#### Meetings Committee

This Committee oversees and coordinates logistics for WAVMA-organized or sponsored aquatic veterinary educational meetings, including the Annual General Meeting.

Chair: Julius Tepper, [cypcarpio@aol.com](mailto:cypcarpio@aol.com)

#### Membership Committee

This Committee oversees membership issues to optimally serve individual members and the organization. Co-Chair: Chad Harris [caharris24@yahoo.com](mailto:caharris24@yahoo.com)

#### Student Committee

This Committee facilitates networking between student members and helps development of student programs and services.

Chair: Justin Krol, [justkrol21@gmail.com](mailto:justkrol21@gmail.com)

## COMMITTEE REPORTS

## Certified Aquatic Veterinarians

Last Name	First Name	Email Address	Country
Bastos-Gomes	Giana	<a href="mailto:giana.gomes@jcu.edu.au">giana.gomes@jcu.edu.au</a>	Australia
Bjornebo	Heather	<a href="mailto:reptivet@gmail.com">reptivet@gmail.com</a>	USA
Bogan	James	<a href="mailto:thecritterfixer@gmail.com">thecritterfixer@gmail.com</a>	USA
Cecil	Todd	<a href="mailto:waavs@aol.com">waavs@aol.com</a>	USA
Corcoran	Michael	<a href="mailto:mikecdvmcertaqv@gmail.com">mikecdvmcertaqv@gmail.com</a>	USA
Cornwell	Emily	<a href="mailto:erc58@cornell.edu">erc58@cornell.edu</a>	USA
Docherty	Darren	<a href="mailto:dmdocherty@gmail.com">dmdocherty@gmail.com</a>	UK
Doherty	Simon	<a href="mailto:simon@blackwaterconsultancy.com">simon@blackwaterconsultancy.com</a>	UK
Dublin	Devon	<a href="mailto:devdub@yahoo.com">devdub@yahoo.com</a>	Japan
Faisal	Mohamed	<a href="mailto:faisal@cvm.msu.edu">faisal@cvm.msu.edu</a>	USA
Good	Christopher	<a href="mailto:c.good@freshwaterinstitute.org">c.good@freshwaterinstitute.org</a>	USA
Hayakijkosol	Orachun	<a href="mailto:orachun.hayakijkosol1@jcu.edu.au">orachun.hayakijkosol1@jcu.edu.au</a>	Australia
Johnston	Colin	<a href="mailto:brightwaterconsultingnz@gmail.com">brightwaterconsultingnz@gmail.com</a>	New Zealand
Jorgensen	Kasper	<a href="mailto:kai@denblaaplanet.dk">kai@denblaaplanet.dk</a>	Denmark
Joseph	Brian	<a href="mailto:brianjoseph522@gmail.com">brianjoseph522@gmail.com</a>	Canada
Kottwitz	Jack	<a href="mailto:jack_kottwitz@hotmail.com">jack_kottwitz@hotmail.com</a>	USA
Lloyd	Richard	<a href="mailto:richlloyduk@gmail.com">richlloyduk@gmail.com</a>	UK
Loh	Richmond	<a href="mailto:thefishvet@gmail.com">thefishvet@gmail.com</a>	Australia
Maas	Adolf	<a href="mailto:DrMaas@ZooVet.us">DrMaas@ZooVet.us</a>	USA
Metselaar	Matthijs	<a href="mailto:matthijs.metselaar@fishvetgroup.com">matthijs.metselaar@fishvetgroup.com</a>	UK
Miller-Morgan	Tim	<a href="mailto:tim.miller-morgan@oregonstate.edu">tim.miller-morgan@oregonstate.edu</a>	USA
Mohammed	Haitham	<a href="mailto:hhm0003@auburn.edu">hhm0003@auburn.edu</a>	Egypt
Neethling	Ross	<a href="mailto:Rossneethling@yahoo.co.uk">Rossneethling@yahoo.co.uk</a>	UK
Palić	Dušan	<a href="mailto:d.palic@lmu.de">d.palic@lmu.de</a>	Germany
Palmeiro	Brian	<a href="mailto:peffishdoctor@gmail.com">peffishdoctor@gmail.com</a>	USA
Pasnik	David	<a href="mailto:chesapeakeaquatic@yahoo.com">chesapeakeaquatic@yahoo.com</a>	USA
Questen	Jena	<a href="mailto:drquesten@gmail.com">drquesten@gmail.com</a>	USA
Reed	Aimee	<a href="mailto:reed@onid.orst.edu">reed@onid.orst.edu</a>	USA
Reichley	Stephen	<a href="mailto:stephen.reichley@gmail.com">stephen.reichley@gmail.com</a>	USA
Sahatrakul	Komsin	<a href="mailto:komsin.s@rwsentosa.com">komsin.s@rwsentosa.com</a>	Singapore
Saint-Erne	Nick	<a href="mailto:nsainterne@gmail.com">nsainterne@gmail.com</a>	USA
Sanders	Jessie	<a href="mailto:nfishvet@gmail.com">nfishvet@gmail.com</a>	USA
Scarfe	David	<a href="mailto:dscarfe@ameritech.net">dscarfe@ameritech.net</a>	USA
Shelley	John	<a href="mailto:thejohnnyshelley@yahoo.com">thejohnnyshelley@yahoo.com</a>	USA
Soto	Esteban	<a href="mailto:balasotom@gmail.com">balasotom@gmail.com</a>	USA
Tepper	Julius	<a href="mailto:cypcarpio@aol.com">cypcarpio@aol.com</a>	USA
Tiberio	Sharon	<a href="mailto:srtiberio@att.net">srtiberio@att.net</a>	USA
Urdes	Laura	<a href="mailto:laurau_2005@yahoo.com">laurau_2005@yahoo.com</a>	Romania
Van de Sompel	Greta	<a href="mailto:johan.van.der.cruyssen@telenet.be">johan.van.der.cruyssen@telenet.be</a>	Belgium
Walster	Christopher	<a href="mailto:chris.walster@onlinevets.co.uk">chris.walster@onlinevets.co.uk</a>	UK
Weber	Scott	<a href="mailto:sharkdoc01@gmail.com">sharkdoc01@gmail.com</a>	USA
Welsh	Trista	<a href="mailto:trista.welsh@gmail.com">trista.welsh@gmail.com</a>	USA
Werkman	Peter	<a href="mailto:piwerkman2@gmail.com">piwerkman2@gmail.com</a>	Holland
Wong	Howard	<a href="mailto:hkh Wong@cityu.edu.hk">hkh Wong@cityu.edu.hk</a>	Hong Kong

## Credentialing Committee

The WAVMA CertAqV Program is administered by the WAVMA Credentialing Committee, along with the assistance of other Certified WAVMA members who serve as mentors and adjudicators.

To be credentialed by WAVMA as a Certified Aquatic Veterinarian and utilize the CertAqV honorific, individuals must be a WAVMA member, have a veterinary degree from a nationally recognized veterinary school, college or university and have demonstrated general knowledge and competency in core subject areas that are currently considered necessary to practice aquatic veterinary medicine. Students of a nationally recognized veterinary institution of higher education can register for the program, but will not be certified or entitled to utilize the CertAqV honorific until they graduate.

Individuals that desire to participate in the WAVMA CertAqV Credentialing Program are required to:

- Register for the Program (application at [www.wavma.org](http://www.wavma.org)).
- Identify a mentor to assist the registrant through the Program. The potential mentors would be available WAVMA Certified Aquatic Veterinarians.
- Provide the mentor with written evidence of satisfactory completion of each of the core Knowledge, Skills and Experience (KSE) subject areas.
- Be adjudicated by the Credentialing Committee for recognition of completion of all KSE requirements after the mentor has approved the documentation.
- Have the CertAqV certification approved by the WAVMA Executive Board.

The WAVMA Certified Aquatic Veterinarian (CertAqV) program has now certified 44 aquatic veterinarians. Please welcome our latest Certified Aquatic Veterinarians:

Dr Darren Docherty  
 Dr Simon Doherty  
 Dr Kasper Jorgensen  
 Dr Richard Lloyd  
 Dr Haitham Mohammed  
 Dr Ross Neethling  
 Dr Howard Wong

There are an additional forty other WAVMA members currently in the process of being certified. For more information, see the WAVMA website:

<http://www.wavma.org/CertAqV-Pgm>.

**Tim Miller-Morgan, DVM, CertAqV**  
 2016 Credentialing Committee Chair

**Meetings Committee**

**THE ANNUAL GENERAL MEETING 2016**  
 by Julius Tepper

Our Annual General Meeting 2016 was a dinner meeting held on Saturday evening, August 6th at the Restaurant *Biga on the Banks*. This was a spectacular dining experience, right off the world famous San Antonio Riverwalk, in San Antonio, Texas, USA. The Meeting was held in conjunction with the AVMA Convention.



After welcoming cocktails, we all sat in our private meeting room to discuss many aspects of our great organization. Among the members present were our first president, Peter Merrill (far left), our treasurer, Sharon Tiberio, our current president, Nick Saint-Erne, and the David Scarfe (far right), recently elected as President-Elect for 2017.



WAVMA set up our booth at the AVMA Annual Convention, held in San Antonio, Texas, USA, on August 5-9, 2016 (left to right: Sharon Tiberio, Treasurer; David Scarfe, President Elect for 2017; Julius Tepper, Meetings Committee Chair and Nick Saint-Erne, the President).

*N.B.: The attendee on the left is very interested in our promo video, as were many of the vet students attending.*

**Julius M. Tepper, DVM, CertAqV**  
 Meetings Committee Chair  
[cypcarpio@aol.com](mailto:cypcarpio@aol.com)



*WAVMA is on Facebook!*

“Like” WAVMA's Facebook Page and join the WAVMA Facebook group to keep up-to-date with WAVMA activities and aquatic veterinary medicine topics from around the world.

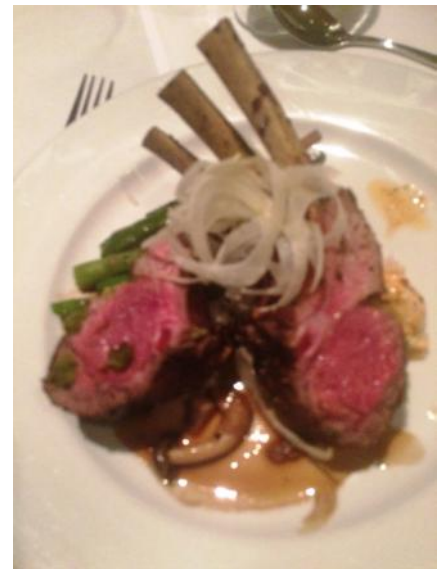
Search for WAVMA at [www.facebook.com](http://www.facebook.com).



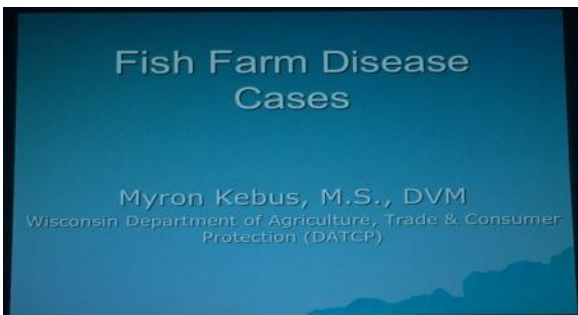
AAFV President Myron Kebus and  
WAVMA President Nick Saint-Erne  
At the AVMA Convention



Not a catfish, but a cool cat, anyway!  
AVMA Convention Exhibitor's Hall.

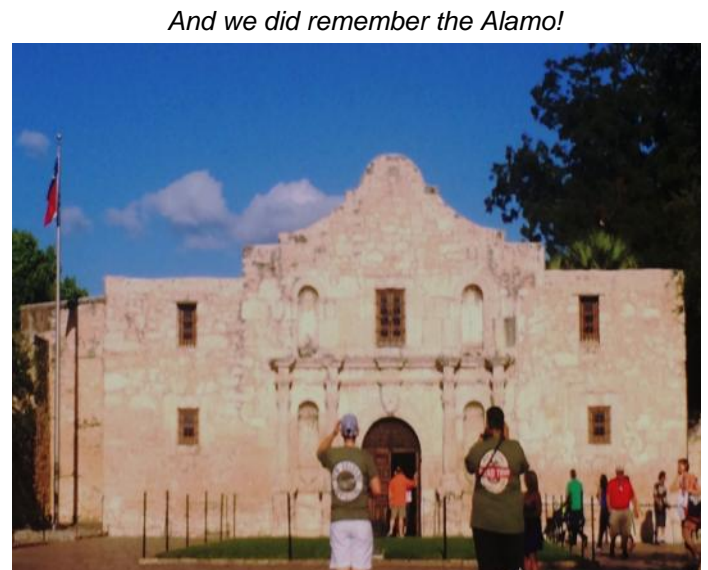
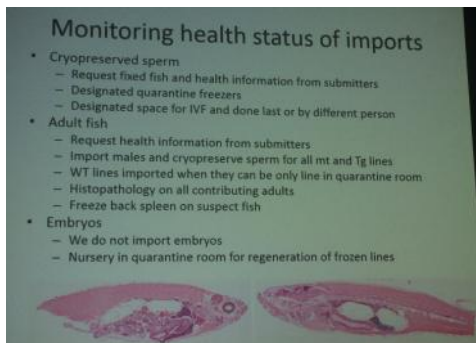


Lamb chop dinner  
at the WAVMA  
Annual General  
Meeting.  
Yes, there was  
also fish served  
for those  
piscavores  
who attended.



Above: Title slide from Myron Kebus' lecture.

Right:  
Slide from  
Zebrafish  
Biosecurity  
lecture by  
Katrina  
Murray.



And we did remember the Alamo!

## Fellowship Advisory Council

WAVMA has established a fellowship program to recognize those world-renowned veterinarians who have advanced aquatic veterinary medicine as a discipline and devoted their time and efforts to serve WAVMA's mission. The Fellowship Advisory Council allows Fellows to advise the Executive Board with guidance on their initiatives, and mentor applicants for Aquatic Veterinarian Certification (CertAqV).

Our WAVMA Distinguished Fellows are:

Dr. Peter L. Merrill  
Dr. Ronald J. Roberts  
Dr. A. David Scarfe  
Dr. Julius M. Tepper  
Dr. Christopher I. Walster  
Dr. Dusan Palic  
Dr. Grace Karreman  
Dr. Marian McLoughlin

See: <http://www.wavma.org/wavma-fellows.cfm?>

## Executive Board Responsibilities

The Executive Board has the responsibility for charting the course of WAVMA, fiduciary oversight of all issues, and, with input of committees, provides the oversight and approval for all WAVMA programs and services that fulfill the Mission and Objectives of the organization. The Board generally meets once a month through teleconferences, to discuss and approve WAVMA programs, services, and policies that drive the organization and issues that affect aquatic veterinary medicine. Members may submit items for discussion at the next Executive Board by contacting the [WAVMA Secretary](#).

## WAVMA Shop

A number of WAVMA branded items  
(including shirts, mugs, caps) are available  
at the WAVMA Store. Get yours today!



Go to: <http://www.wavma.org/Shop>

## CURRENT VETERINARY SCHOOL WAVMA CHAPTERS

**Auburn University, [College of Veterinary Medicine](#) (established 2013)**  
**2016 Officers** - Kate Butzen (President), Patricia Debow (Vice President), Erika Gibson (Treasurer), Lindsay Lawreck (Secretary); **Faculty Advisors** - Drs. Ray Wilhite & Jack Kottwitz; **Chapter Contact** - [click here](#).

**Mississippi State University, [College of Veterinary Medicine](#) (established 2014)**  
**2016 Officers** - Elizabeth Works (President), Taylor James (Vice-President), David Mills (Treasurer), Madeleine Hendrix (Secretary); **Faculty Advisor** - Dr. Wes Baumgartner; **Chapter Contact** - [click here](#).

**Murdoch University, [School of Veterinary & Life Sciences](#) (established 2014)**  
**2016 Officers** - Ming Jun Lim (President), Cheryl Tan (Vice President), Chermaine Lim (Treasurer), Jia Wen Lim (Secretary); **Faculty Advisors** - Drs. Lian Yeap & Richmond Loh; **Chapter Contact** - [click here](#).

**Ross University, [School of Veterinary Medicine](#) (established 2015)**  
**2016-2017 Officers** - Larissa Menke (President), Erika Brigante (Vice President), Jean Fournier (Secretary), Robin Sayres (Treasurer), Michelle Sparks (Wetlab Coordinator), Mandy Murti (Fundraising Chair); **Faculty Advisors** - Drs. Don Bergfelt & Mark Freeman; **Chapter Contact** - [click here](#).

**Tuskegee University, [School of Veterinary Medicine](#) (established 2012)**  
**2016 Officers** - Jacqueline Elliott (President), Jennifer Algarin (Vice President), Jennifer Algarin (Secretary), Aaron Judson (Treasurer), Ayxa Rosado (Historian), TBD (Fundraising Chair); **Faculty Advisor** - Dr. Kenneth Newkirk; **Chapter Contact** - [click here](#). View the Chapter's [Facebook](#) page.

**University of Florida, [College of Veterinary Medicine](#) (established 2013)**  
**2016 Officers** - Haley Violetta (President), Riley Shugg (Vice President), Kaylee Brown (Treasurer), Megan Joyce (Secretary); **Faculty Advisor** - Dr. Tom Waltzek; **Chapter Contact** - [click here](#).

**University of Georgia, [College of Veterinary Medicine](#) (established 2015)**  
**2016 Officers** - Kristina Pascutti / Laura Burns (Co-Presidents), Sara Collins (Vice-President), Jaclyn Levin (Treasurer); **Faculty Advisor**, Dr. Alvin Camus; **Chapter Contact** - [click here](#).

**University of Minnesota, [College of Veterinary Medicine](#) (established 2016)**  
**2016 Officers** - Sarah Knowles (Chair), Angela Jackson (Secretary); **Faculty Advisor** - Dr. Amy Kizer; **Chapter Contact** - [click here](#).

**University of Sydney, [Faculty of Veterinary Science](#) (established 2014)**  
**2016 Officers** - Ellen Rasidi (President), Arthur Chau (Secretary), Dr. Paul Hick (Treasurer); **Faculty Advisor** - Dr. Paul Hick; **Chapter Contact** - [click here](#).

**University of Tennessee, [College of Veterinary Medicine](#) (established 2012)**  
**2012/13 Officers** - Wesley Siniard & Grace Normann (Co-Presidents), Krista Lipe (Vice President), Carrie Dobey (Secretary), Samantha Schraith (Treasurer), Bree Dell (Wetlab Coordinator); **Faculty Advisors** - Dr. Michael Jones & Dr. Debra Miller; **Chapter Contact** - [click here](#). View the Chapter's [Facebook](#) page or [website](#).

**University of Wisconsin-Madison, [School of Veterinary Medicine](#) (established 2014)**  
**2016 Officers** - Katherine Hausmann (President), Nikki Wuestenhagen (Vice President), Geoffrey Gieni (Secretary), Jenna Newman (Treasurer), Jenna Epstein (Activities Coordinator); **Faculty Advisor** - Dr. Mike Collins; **Chapter Contact** - [click here](#).

**Western University of Health Sciences, [College of Veterinary Medicine](#) (established 2014)**  
**2016 Officers** - Andrew Switaj (President), Alexis Wohl (Vice President), David Abolnik (Secretary), Hali Jungers (Treasurer); **Faculty Advisor** - Dr. Suzana Tkalicic; **Chapter Contact** - [click here](#). View the Chapter's [Facebook](#) page.

For information or assistance, please contact the **WAVMA Chapter Contact** for each school. To initiate a new Student Chapter see the "**Guidance for Forming a New Student Chapter**" ([click here](#) to download PDF).

**SCHOLARSHIP COMMITTEE:  
 2016 Pitts Education Awards Program Report**

**IAAAM Conference**  
**John Griffioen**  
 2018 DVM Candidate,  
 North Carolina State University

I am truly honored to be a recipient of John L. Pitts Aquatic Veterinary Education Award this year, and it has been an important source of funding as I pursue a career in aquatic animal medicine. A portion of these funds were used to help cover travel expenses associated with attending the 2016 International Association for Aquatic Animal Medicine (IAAAM) meeting in Virginia Beach, Virginia.

This conference provided an unparalleled opportunity to build professional connections with an array of veterinarians spanning from students to legends in the field of aquatic animal medicine. Student focused sessions allowed for exploration of externship possibilities and current opportunities in research.

The breadth of scientific presentations ranged from cetaceans and sea turtles to fish medicine, one health, and invertebrate medicine. The tremendous diversity of interests at the conference was exciting and encouraging as I begin navigating a career in this discipline. The collaboration and representation of veterinarians across the globe was an emphatic reminder that we face challenges in this field that stretch far beyond national borders, and global cooperation and communication will be vital in maintaining the health of the environment. Ultimately the conference provided an opportunity to see the current state of medicine and research in aquatic animal health, which is often lacking in traditional veterinary curriculums.

While aquatic medicine is fortunately integrated into the curriculum at NC State, this will be a challenge for many students hoping to pursue careers with limited exposure during veterinary school. Conferences like IAAAM provide an incomparable opportunity for students like myself to gain a better perspective of the field and they serve as a catalyst for future aquatic animal veterinarians. Organizations like WAVMA that provide resources and scholarships for passionate students are truly shaping the future of aquatic animal medicine.

*John Griffioen with Loggerhead sea turtle at Virginia Aquarium*



*Below: (left to right) Dr. Greg Lewbart, John Griffioen, Dr. Sam Ridgway, Dr. Michelle Schisa, Scott Hammer at the 47<sup>th</sup> Annual IAAAM Conference, May 2016.*



*NC State Alumni, Faculty and Current Students at the 47<sup>th</sup> Annual IAAAM Conference, May 2016.*



**2016 Pitts Education Awards Program Report**

**Rebuilding an Arapaima While Dismantling Everything Else**

**Christina McKenzie**  
 2017 DVM Candidate,  
 University of Saskatchewan

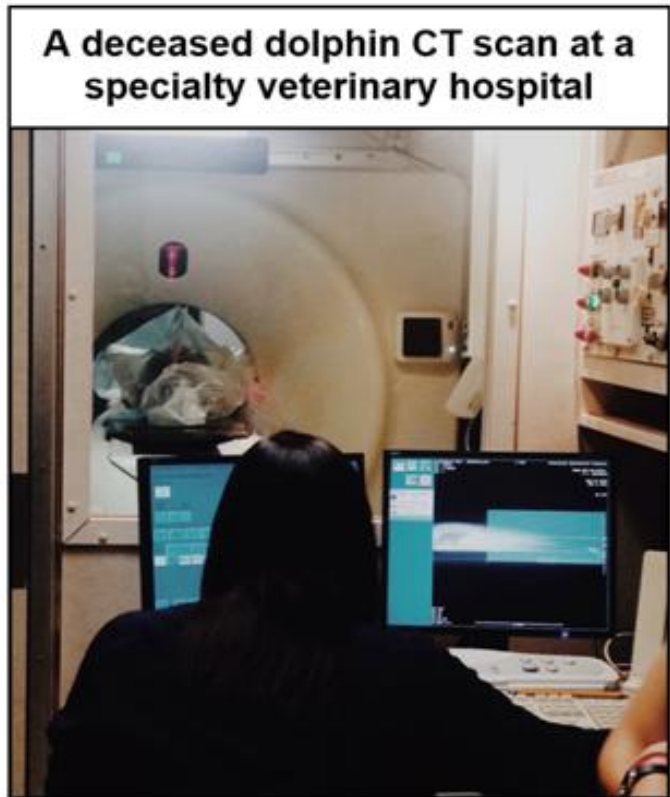
Controlled mayhem breaks out behind the scenes at SeaWorld San Diego when they get “The Call.” A dolphin has stranded at Torrey Pines State Park, and the race to rescue her is on. Despite the skill and speed of the rescue team, the dolphin didn’t survive to see the concerned faces of the rescue crew. The investigation begins, and the dolphin is transferred to the pathology team. As the veterinary pathology extern visiting SeaWorld for 10 weeks, I’m about to experience my first dolphin necropsy. Since I’m a fourth year veterinary student hailing from the middle-of-the-prairies Saskatchewan, it’s not exactly something I get to see every day.

Most people don’t know what goes on in the back of SeaWorld, but it has an extensive rescue and rehabilitation program serving marine birds and mammals, and it comprises a significant portion of the Marine Mammal Stranding Network in Southern California. Last year 386 birds, 995 pinnipeds and three dolphins were rescued and six large whales were untangled. Sadly, many of these animals are beyond the expert help of the SeaWorld veterinary team and their visit ends in necropsy rather than release. In most cases, to determine why an animal died and hopefully inform future disease outbreak investigations, we take gross necropsy pictures, describe lesions and collect a variety of tissues samples, culture swabs and fluid samples for further analysis.



**A stranded short-beaked common dolphin being prepared for necropsy**

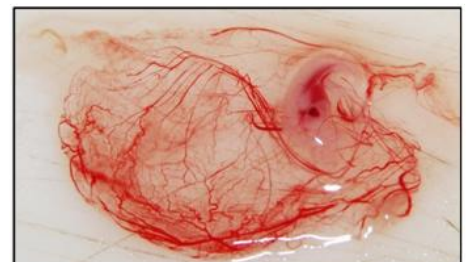
However, stranded cetaceans are a special situation and get V.I.P. treatment. Since three dolphins have stranded on the same stretch of coast during the past ten days, everyone is keen to solve the mystery and get a diagnosis. First, the dolphin is driven to the Veterinary Specialty Hospital of San Diego to get a full body CT scan courtesy of the National Oceanic and Atmospheric Administration (NOAA). When the pathology technicians and I arrive, the receptionist doesn’t bat an eye when we tell him that we have a dead dolphin on ice in



**A deceased dolphin CT scan at a specialty veterinary hospital**

the back of a truck. CT scans provide valuable information that could easily be missed on a routine necropsy, such as evidence of hydrocephalus or damage associated with military sonar use. After the scan, we head back to the necropsy facilities at SeaWorld where we collect a variety of morphometric measurements, from total length of the dolphin to the distance between the eye and the pinhole-sized ear opening. We also weigh, measure and subsample all of the major organs. Samples are taken both for histopathology and for frozen tissue banks used for ancillary testing or for research. On necropsy, the only major finding was a corpus luteum on the left ovary and a 2 cm fetus in the left horn of the uterus; our stranded dolphin was pregnant!

A few days later, the radiologist who interpreted the CT reported a diagnosis of hydrocephalus and no evidence of drowning. The two most common causes of hydrocephalus in dolphins are brucella and morbillivirus. Both of these pathogens have been implicated in unusual mortality events in dolphins on the East Coast. Ancillary testing looking for both of these pathogens is ongoing.

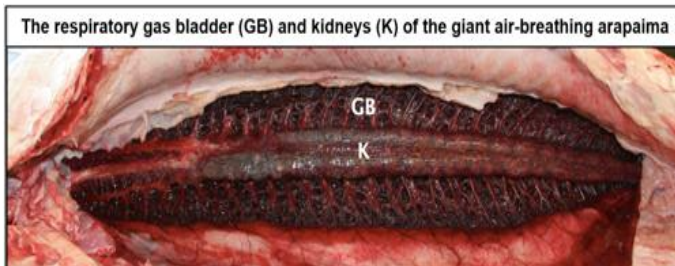


**A dolphin fetus still in the amniotic sac**



In between necropsies, I've been rebuilding from gross necropsy reports, histopathology, CT and MR data an arapaima that died in 2010, for publication in a scientific journal. Arapaima are giant osteoglossids from the Amazon basin that are obligate air-breathers, which can reach up to 4 m in length. Arapaima use their gas bladder as a respiratory organ, producing one of the most striking adaptations to hypoxia present in Amazonian fish.

To increase the surface area available for gas exchange, the gas bladder runs the length of the coelomic cavity encompassing the kidneys and is compartmentalized by a highly vascularized webbing of trabeculae. As a result of this drastic change in function, arapaima have undergone extensive anatomical and physiological changes in almost every other organ system.



As juvenile arapaima mature from water-breathers to air-breathers, their gills undergo irreversible atrophy. This includes severe blunting and broadening of the lamellae to decrease surface area and limit the amount of oxygen leached from the arapaima's blood into the hypoxic water. Since the gills are so reduced, the kidneys are required to pick up some of their excretory functions, creating higher concentration urine than seen in water-breathing fish. In arapaima, the kidneys are not divided into a hematopoietic "head" and excretory "trunk", instead the hematopoietic and excretory tissues are distributed throughout the length. We also found that arapaima have a surprisingly large telencephalon, a structure considered to be related to overall intelligence, and a small optic tectum, which could be related to the murky waters in which they live.

Unfortunately, the characteristics that allow arapaima to perfectly exploit their natural environment make them easy targets for overfishing and their habitat is at high risk from climate change and anthropogenic activities. As arapaima are the only freshwater Amazonian teleost protected under ICUN and CITES. Considering the challenges that face arapaima and how many critical questions remain to be answered, it is critical that we collect as much information about their unique adaptations before the opportunity is lost.

Collecting and assimilating information about the comparative anatomy, physiology and disease processes of animal species is at the core of why veterinary pathology is such an important discipline, especially when it comes to aquatic species where there is such extreme diversity.

During my time at SeaWorld, I've had the opportunity to necropsy California sea lions, guitarfish, a flamingo, dolphins, a pilot whale and a scorpionfish, among many other animals. The amount I have learned about comparative medicine, beyond the traditional species we learn about in veterinary school, is staggering. Since my intention is to become a board-certified pathologist specializing in aquatic species, this externship and the support of the John L. Pitts Education Awards Program have been invaluable. Who knew that it is completely normal for pelicans to have extreme subcutaneous emphysema over the keel to help distribute the force of hitting the water when diving for fish?

*Below:*

*This picture is from a boat release for seven rehabilitated juvenile California sea lions.*



**Dr. Doug Mader - Man of the Hour!**

by Dr. Stacey Leonatti Wilkinson

Reprinted from the ARAV's *Herp Blerp* newsletter, September 2016, used with permission.

<http://arav.org/>

The article also appears on the ARAV website at:

<http://arav.org/professionals/newsletter/>

The Association of Reptile and Amphibian Veterinarians' Executive Committee is honored and pleased to present the 'Fredrick L. Frye Lifetime Achievement Award' to Dr. Douglas Mader, MS, DVM, DABVP (Canine & Feline, Reptile & Amphibian), DECZM (Herpetology). Dr. Mader is the 6th Lifetime Achievement Award winner since its creation in 1998. Prior to Dr. Mader, it was awarded to Dr. Frederick Frye, Dr. Elliot Jacobson, Dr. John Cooper, Dr. Kevin Wright (posthumously), and Dr. Wilbur Amand.

Dr. Mader has made many contributions to reptile and amphibian medicine. He is known best as the editor of the texts *Reptile Medicine and Surgery* and *Current Therapy in Reptile Medicine and Surgery*, used by veterinarians all over the world. He is an author of numerous book chapters, scientific journal articles, and publications reaching the herpetological community in general, from veterinary professionals to enthusiasts. He is a renowned speaker, both nationally and internationally and has won multiple awards. Dr. Mader is heavily involved with multiple conservation efforts affecting native wildlife (see below). Anyone who treats reptiles and amphibians has been affected and influenced by Dr. Mader, making him a most deserving recipient of this award.

This month's member spotlight on conservation also features Dr. Doug Mader's involvement and efforts in conservation. Below is an interview he recently gave with the *Herp Blerp* about the organizations he works with.

• Dr. Mader, please, describe the mission/goals/purpose of the organizations with which you work.

"I work with several organizations. Perhaps the most visible is The Turtle Hospital in the Florida Keys. I also work with the National Key Deer Refuge and several small non-profit wildlife rescue centers here in the Florida Keys. The mission is to protect and help the indigenous wildlife, many of which are endangered or threatened.

• Do you have specific research or a project your organization is working on currently?

"At the hospital we are working on several projects including pharmacokinetic studies, endosurgical approaches, adhesives for treating shell injuries, treatments for "floaters", and many others.



Editor's note: "Floaters" are sea turtles suffering from "Floating Syndrome" where a sea turtle develops abnormal buoyancy, preventing the turtle from diving.

• What type of reptiles or amphibians are you working with? How many species?

"Many species. Sea turtles are the most common, but I also work with the American alligator and American crocodile."

• How many animals are impacted by the organizations you work with yearly?

"At the Turtle Hospital we rehabilitate approximately 200 sea turtles per year. On any given night we have between 40- 50 "in-patients." I usually work on about a dozen wild alligators, crocodiles and Key deer annually."

• What kind of resources are needed for projects of this magnitude?

"The Key Deer Refuge is government funded, while the other groups are all funded by donations. Donations can be made to the Turtle Hospital directly through their website. They all do amazing work on extremely limited budgets. The Turtle Hospital is self-sustaining with its own brick and mortar facility. They now make enough money on tourist visits and Florida license plate grants that they can afford a permanent staff. The other groups use my hospital when they have injured animals."

• How did you get involved with this work as a veterinarian?

"I simply went to them and offered to help."

• How long have you been involved in this area of conservation work?

"For the past 20+ years."



- What inspired you to work specifically in this area of conservation?

“Aside from their inherent value as living, sentient beings – animals that deserve respect and care - I consider the local wildlife to be part of my “Florida Keys family.” I look out my window and see them every day. How can I not use what I have learned over the years to help them if they need it?”

- What success stories can you share with us?

“Anytime you can release an animal back to the wild it is a victory. We tag all released turtles. A couple of years back we tagged and released a three flipper turtle. The following year it was spotted nesting on one of the local beaches. Success! My efforts were recognized in 2010 when I received the U. S. Fish and Wildlife Conservation Award for my work.”

- How can ARAV members get involved? Are there opportunities for veterinarians or vet students to participate in or be a part of these projects?

“I personally think that not only ARAV members, but EVERY veterinarian should make some effort to help with conservation. People respect veterinarians in general and tend to listen to us when we speak, and also, we are role models for youngsters. Even if you don't go out in the field and help with the wildlife, you can get involved by giving lectures, having educational material in veterinary offices, writing articles for local papers, etc.”

- What is your favorite reptile/amphibian and why?

“It has changed over the years, but, as of today, I think it is the alligator. They have been around unchanged since the beginning of time. Humans almost drove them to extinction. Now, humans can do their part to protect them.”



## HERP BLERP

The latest news from the Association of Reptilian and Amphibian Veterinarians

- Who are some of your heroes (both within and outside of your field)?

“All service men and women in the Armed Forces. Fred Frye, Leonard Marcus, Murray Fowler, Charles Sedgwick, Jane Goodall, Diane Fossey, Jack Hanna, Charles Darwin and many more.”

Everyone can agree that Dr. Doug Mader's contributions to the field of reptile and amphibian medicine and conservation are matched by very few. Congratulations to Dr. Mader as a most deserving recipient of the Fredrick L. Frye Lifetime Achievement Award!

<http://navc.informz.net/informzdataservice/onlineversion/ind/bWfPbGluZ2luc3RhbmNlaWQ9NTkzMjU1MiZzdW-JzY3JpYmVyaWQ9MTA4MTc0ODYyMw>



## AUTHOR'S INSTRUCTIONS

**Instructions for Authors and Contributors**

While any information relevant to aquatic veterinary medicine might be published, we particularly invite contributions for the following regular columns in *THE AQUATIC VETERINARIAN*:

**Colleague's Connection**

An article explaining why and how a veterinarian became interested in aquatic veterinary medicine and what that veterinarian has done in their aquatic veterinary career.

**Peer-Reviewed Articles**

Original research or review of any aquatic veterinary topic. Articles will be reviewed by 3 veterinarians and comments and changes referred back to the author prior to publication. The text for an article begins with an introductory section and then is organized under the following headings:

- Materials and Methods
- Results
- Discussion (conclusions and clinical relevance)
- References (cited in the text by superscript numbers in order of citation).

**Clinical Cases**

Clear description of a distinct clinical case or situation and how it was resolved. These may be submitted for peer-review. Begin with the signalment (species, age, sex, body weight or length) of the animal or animals, followed by a chronologic description of pertinent aspects of the diagnostic examination, treatment, and outcome, and end with a brief discussion.

**Book Reviews**

Brief review of a published book, including an overview and critique of the contents and where to obtain the book.

**Publication Abstracts**

Abstracts of published veterinary and scientific journals with full citation/reference (authors, date, title, and journal volume and page numbers – ½-1 page).

**News**

Brief synopsis or information about aquatic veterinary news published elsewhere. List original source of information.

**Legislative & Regulatory Issues**

Synopsis or description of emerging legislation or regulations with information on how to access further detailed information or a link to website.

**Meetings and Continuing Education and Professional Development (CE&PD) Opportunities**

Description or synopsis of upcoming aquatic veterinary or (veterinarian-relevant) non-veterinary in-person or on-line educational meetings noting the meeting title, dates, location, and contact person or website.

**Jobs, Internships, Externships or Residencies**

Description with specific contact information for veterinary student externships and post-graduate internships or residencies at private practices, institutions, universities or organizations. Description of available full or part-time employment for aquatic veterinarians, with contact information.

**Advertising**

See advertising rates on page 4.

**Please send articles, clinical reports, or news items to the editor by the following submission dates:**

- Issue 1 – February 15 (published in March)
- Issue 2 – May 15 (published in June)
- Issue 3 – August 15 (published in September)
- Issue 4 – November 15 (published in December)

All submissions should be in 10-point Arial font, single spaced. Submissions may be edited to fit the space available.

We can also use editors to proof-read submissions or review articles. Please contact the Editor if you are interested in assisting.

The World Aquatic Veterinary Medical Association also has opportunities for members to assist with committees. Contact any member of the Executive Board to volunteer to help.



**DO YOU HAVE A STORY TO TELL ABOUT  
HOW YOU BECAME  
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Send your article (<1,000 words) with pictures to  
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**Questions & Answers from the WAVMA Listserv**  
([WAVMA\\_Members-L@wavma.org](mailto:WAVMA_Members-L@wavma.org))

**Ticks on Turtles**

Hello WAVMA members,

My lawn man in Florida just called, his "pet" turtle who lives outside has a tick on his neck. The turtle retracts his neck when trying to remove the tick. Any suggestions?

I don't know which (if any) products are safe for use in Chelonians. Does anyone have experience with parasiticides that are safe for tick removal in Chelonians?

Thanks,

**Sharon R. Tiberio, DVM, CertAqV**  
Certified Aquatic Veterinarian  
My Fish Vet, Inc.  
[stiberio@att.net](mailto:stiberio@att.net)

Fipronil is safe and effective. Semi-aquatic species need to be dry-docked. [Kept out of water during treatment.]

**Adolf Maas**

Has anyone tried using Afoxolaner (Nexgard) or Fluralaner (Bravecto) for tick prevention in aquatic/semi-aquatic species? I only wonder because it is an oral administration, and in theory, individuals may not need to be dry-docked.

**Eric M. Littman, DVM Candidate 2017**  
Cummings School of Veterinary Medicine  
Tufts University  
[eric.littman@tufts.edu](mailto:eric.littman@tufts.edu)

I see this a lot especially in wild forest tortoises and sliders. I mostly see ticks tucked in leg folds by the carapace or plastron and rarely on the neck area. I have always pulled them off with flathead (not rat-toothed) forceps or tweezers dipped in alcohol or alcoxidine. Grab the tick as close to the mouthparts as you can and pull gently and firmly to dislodge the tick with head intact. Takes about 5 minutes. Check for underlying causes of infection unless they are to be immediately released to the wild.

**Elizabeth Kaufman, DVM**  
Jerusalem Biblical Zoo  
Jerusalem, Israel  
[lizvet.kaufman@gmail.com](mailto:lizvet.kaufman@gmail.com)  
[www.jerusalemzoo.org.il](http://www.jerusalemzoo.org.il)

**Tick removal instructions from Doctors Foster and Smith website:**

Ticks should be manually removed from the reptile using small forceps or tweezers.

1. Grab the tick by the head or mouth parts right where they enter the skin. Do not grasp the tick by the body.
2. Without jerking, pull firmly and steadily directly outward. Do not twist the tick as you are pulling.
3. Using methods such as applying petroleum jelly, a hot match, or alcohol will NOT cause the tick to 'back out.' In fact, these irritants may cause the tick to deposit more disease-carrying saliva in the wound.
4. After removing the tick, place it in a jar of alcohol to kill it. Ticks are NOT killed by flushing them down the toilet.
5. Wash your hands thoroughly.

Please do not use your fingers to remove or dispose of the tick. We do not want you in contact with a potentially disease-carrying tick. Do NOT squash the tick with your fingers. The contents of the tick can transmit disease.

See complete article here:

<http://www.peteducation.com/article.cfm?c=17+1796&aid=2433>

**Control and eradication of chelonian tick infestations, with particular reference to vectors of heartwater.**

Burridge MJ1, Simmons LA, Peter TF, Mahan SM.  
*Annals of N Y Acad Sci.* 2002 Oct;969:294-6.

**Abstract**

Studies using the African tortoise tick (*Amblyomma marmoratum*) and leopard tortoises (*Geochelone pardalis*) demonstrated that cyfluthrin and permethrin were safe and efficacious acaricides for control of *Amblyomma* ticks on tortoises.

A protocol was developed that successfully eradicated an *A. sparsum* infestation from a tortoise breeding facility in Florida. It involved treatment of all tortoises with a permethrin formulation, followed by treatment of the premises with a cyfluthrin formulation. Sentinel tortoises were later placed on the treated premises to establish successful tick eradication.

PMID: [12381608](https://pubmed.ncbi.nlm.nih.gov/12381608/)

## RAISING SEA TURTLES FOR RESEARCH

**Jeanette Wyneken, Ph.D.**

Dept. of Biological Sciences, Florida Atlantic University,  
Boca Raton, Florida 33431-0991, [jwyneken@fau.edu](mailto:jwyneken@fau.edu)

Marine turtles are imperiled species worldwide and are managed for species recovery. Many aspects of the biology and health of the species can be identified through field captures and surveys of nesting females and their hatchlings. However, significant and important data gaps exist in our knowledge of these turtles because so little of their life occurs on land; they effectively are inaccessible for most of their lives. The hatchling life stages disperse quickly, often traveling hundreds of km from nearshore waters and hence their biology and health are difficult to study. Captive rearing allows one to focus upon distinct life stages and to address key questions regarding nutrition, disease occurrence, and disease treatment.

My laboratory has worked with and maintained three species of marine turtles (loggerhead, *Caretta caretta*; green, *Chelonia mydas*; leatherback, *Dermochelys coriacea*; Figure 1) for short (2-6 months) periods of captivity. Turtles are captured at marked nests equipped with environmental monitoring equipment. Our goal is to address key demographic data gaps (What are hatchling sex ratios and how do they vary?), behavioral issues (Do sea turtles have color vision? Are sea turtle attracted to fishing lights?), and to test techniques (such how to safely satellite tag neonate sea turtles to identify their at-sea nursery grounds). By having neonate turtles in the lab, we were able to extend accurate laparoscopic sex identification to neonates, something considered to be impossible before we started in 2002. Examples of how we rely upon captive rearing for research are highlighted in several published studies (including



*Figure 1. Hatchling green turtles at emergence from the nest. For sex ratio studies we bring in 10 turtles per nest to raise for several months to 120 g size for sex identification. J. Wyneken photo.*



*Figure 2. We conducted several months of laboratory testing of satellite track tag attachments to insure that the turtles swam, fed, dived, and grew normally. Additionally the tags had to shed without assistance. Before releasing the turtles in the Gulf Stream Current, we also observed their behavior when fitted with tags in the field. Here I snorkel behind a loggerhead shortly before it was released. (See Mansfield et al. 2012). Photo, with permission, Jim Abernerthy.*

Stokes et al. 2006, Wyneken et al. 2007, Gless et al. 2008, Miller et al. 2009, Mansfield et al. 2012, Mansfield et al. 2014, Dudley et al. 2014, Wyneken and Lolavar 2015).

In the process of developing increasingly effective ways to raise healthy turtles for our studies, we developed procedures that contribute to herd health. Each species and project presents us with different challenges to successful captive rearing and in all cases the final outcome is the release of each turtle into an appropriate habitat in excellent health (Figure 2). Nevertheless, the basics apply: select appropriate animals, maintain detailed signalment records, use quarantine procedures, provide sound conditions for growth and behavior, monitor the turtles' feeding and processing daily, train husbandry staff (students in this case), and create a culture that is open to innovation, correction, and refinement.

The hard-shelled or cheloniid species (green and loggerhead turtles in our lab; Figure 3) have been maintained in laboratories for years (see Higgins 2003) and as neonates and small juveniles are carnivorous or omnivorous (feeding on small crustaceans, gelatinous eggs and organism, as well as algae, usually with epibionts). Leatherbacks are exceptionally difficult to raise because of their pelagic (open ocean) life — they do not recognize barriers such as tank walls — and their exceptionally specialized diet of gelatinous prey such as lion's mane jellyfish, pelagic tunicates and pyrosomes. Our innovations in their captive diet have enabled us to advance husbandry of this species suffi-



*Figure 3. Neonate loggerhead turtle. We house the turtles in floating flow-through baskets that provide isolation to prevent aggression. The baskets also serve as surrogate habitat for this species that, as neonates, inhabit spaces in Sargassum mats. J. Wyneken photo.*

ciently to enable several developmental, behavioral and health studies (for example, Gless *et al.* 2008).

Because we work along an urbanized coastline where water quality varies and predator concentrations are high, we raise our animals at an indoor facility where the animals are adequately protected. Consequently, we treat incoming ocean water and illuminate our holding tanks with UVA & UVB light to support adequate calcium metabolism. We have used ZooMed linear fluorescent ReptiSun 5.0 bulbs since they became available. For several years we paired ReptiSun 10.0 and 5.0 bulbs to no greater advantage, so returned to using the 5.0 bulbs. We saw no decrease in animal health with occasional single bulbs and so economize where possible. (Our studies are supported by small grants and donations.) This year we are pairing ReptiSun 5.0 (UVA & UVB) with NatureSun 5.0 (UVA) over each tank (14"-18" from the bulb to surface). Hatchlings and the small juveniles we rear are surface-dwellers and the bulbs are bare so there are no barriers between the bulbs and the water surface (Figure 4).

*Figure 4. After quarantine, these loggerheads are placed in tanks in the colony that are equipped with ZooMed ReptiSun 5.0 bulbs. Each turtle has a system of spots (children's fingernail polish) on its scutes that serve as its "ID number." J. Wyneken photo.*

Our seawater comes from nearshore pipes and is filtered naturally by several meters of overlying sand. For most of the year, our water temperatures are appropriate for our turtles' health and growth. The seawater system is an open flow plan (once though) but can be semi-closed so that we can use fill and flush methods if needed. Rarely, water temperatures during the winter are low enough to require appropriate heating to keep water no less than 22° C.

We have developed appropriate diets for each species and continue to modify their composition as we learn more about the species' requirements and limitations. Our cheloniid diets are modification of the loggerhead diet described by Choromanski *et al.* (1997). Leatherback diets continue to evolve and are derived from Deraniyagala (1936) and Jones *et al.* (2000). We use a gelatin base for all of our diets to help standardize the quantity of food given. We adjust the food quantity to target healthy growth rates (9-11% of body weight for this rapidly growing life stage).



As with any wildlife study, monitoring the health status of the turtles we collect is essential. We work closely with veterinarians who are experts in sea turtle health, including clinicians (Drs. C.A. Harms, D.R. Mader, J.F. Weege,) and pathologists (Drs. D.L. Miller, B.A. Stacy, and M. Garner). Consequently, several health studies have developed opportunistically (for example, Govett *et al.* 2005, Miller *et al.* 2009).

The Florida Atlantic University Marine Laboratory (Figure 5) is just one component of a multi-user facility located within the Gumbo Limbo Environmental Complex in Boca Ration, Florida. The laboratory also hosts important studies on shark and ray sensory biology and behavior, and ocean acidification effects on algae, sea grass, and mangrove roots). Consequently, our facilities must provide appropriate conditions for a variety of studies and species. Additionally, our lab is located in a city park/nature center complex where we have an obligation to allow visitors to see the ongoing science and to explain what we do to visiting public. The lab has an elevated gallery where the public can observe what we do and ask questions. Most visitors are genuinely curious, and students as well as faculty researchers often pause during daily tasks to answer their questions.

#### Acknowledgments

I am grateful to the following agencies and individuals. The studies have been funded by U.S. EPA STAR Program GAD; grant number: R82-9094, Disney World Conservation Fund/Disney Wildlife Conservation, Save Our Seas Foundation, National Marine Fisheries Service, National Save the Sea Turtle Foundation, Florida Sea Turtle License Plate Grants, AWC Foundation, Nelligan Sea Turtle Research, Devoceanjewelry.com, and personal funds.

J. Weege, D. Mader, D. Miller, C. Harms, B. Stacy, M. Garner, C. Manire, and J. Perrault provided expertise on turtle health during several stages of the projects. L. Crowder, S. Epperly, M. Godfrey, S. Heppell, J.D. Miller, K. Mansfield, M. Salmon, and T. Wibbels collaborated on several aspects of the sex ratio, be-

*Figure 5. The Florida Atlantic University Marine Lab is a busy "working lab." Visitors on our observation platform see tanks of turtles as well as the superstructure that supports our labs, GFI electrical lines, and the scientists and scientists-in-training (students) who make this long term research portfolio possible. J. Wyneken photo.*





havioral and ecological studies made possible by the turtles in the laboratory. E. Noonburg and E. Proffitt assisted with the study design and analyses. M. Salmon provided outstanding feedback that improved this manuscript.

The studies would not have been possible without tremendous help of the FAU Sea Turtle Lab students. We particularly thank L. Bachler, K. Blair, L. Celano S. Ceriani, C. Gonzales, M. Rogers, L. Stokes, J. Vaughan, M. Young, and N. Warraich. N. Tempel provided key logistical support. K. Rusenko, the Gumbo Limbo Sea Turtle Program, the Loggerhead Marinelife Center, and the Sanibel Captiva Conservation Foundation provided nest access and coordination. Jim Abernethy Scuba Adventures assisted with at sea turtle releases. The studies were conducted under FAU IA-CUC approval, Florida Sea Turtle permit 073, and USFWS permits to JW.

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### **Quarantine to Prevent or Control Disease Outbreaks in an Aquatic Environment**

**Sherri L. Kasper, DVM**  
**Northwood Animal Hospital, Tallahassee, FL, USA**

A biosecurity program is a protocol that identifies and attempts to mitigate the introduction of those threats that will cause unacceptable morbidity or mortality in your patient population (Oidtmann et al. 2011). The best program will take into account the threats for each individual population and discuss with the clients what acceptable morbidity is for their facility. One of the most important parts of the biosecurity program is the development of a quarantine system. Most veterinarians understand the importance of quarantine, but it is our role to educate the client in its importance by explaining what pathogens may be introduced with the addition of new life to the aquarium.

As a veterinarian, I have worked with a small local aquarium, a fish farm that ships internationally, and several pet fish owners. With each type of fish owner, I have been able to use the same standard of care, but have adapted them to the individual owner's needs. The most challenging aspect about animal medicine is that we are responsible for both the needs of the animal and the owner of that animal. It is important to keep that in mind when establishing a biosecurity program for your patients.

In this paper I will review a list of questions that can be used to help find a balance between the owner's needs and the needs of the aquatic animal in establishing a biosecurity program that will include ongoing veterinary care. I will review the options that should be considered for a quarantine program that will prevent the majority of disease outbreaks, including weighing the risks of prophylactic treatments. The tools found in this paper will help the owner and the veterinarian mitigate the greatest threats to the population.

#### **Pathogen Introduction**

Oidtmann et al. (2011) explains that you need to start with hazard identification (pathogens) that might be threats to the fish and routes of possible contamination. Start by looking at the type or types of fish you will be working with and the type of facility in which the fish are housed. It is important to remember that wild water tends to have connectivity with ponds even if the pond is an artificial body of water.

I begin with the following questions:

Who or what will be in contact with the pond or aquarium (veterinarians and staff members, wildlife, pond/aquarium cleaner)?

What instruments will enter the body of water?

Will new animals be placed in the water with the fish?

Will there be new plants or other objects placed in the water?

After asking these questions, I explain to the owner where I see the potential for pathogen introduction. I discuss possible viral, bacterial, fungal and parasitic diseases and what morbidity they could cause. Then we discuss what changes I would like to see while keeping an open mind to what the client needs and can accomplish.

An example of this can be seen in a biosecurity protocol I established for a small goldfish pond. The client had a pond cleaner coming in every 3 months. This group cleaned the pond with the same equipment that they had just used to clean several other ponds that day. The client had never considered the possibility that this equipment may carry disease. She knew she couldn't clean the pond herself, but she did have her own equipment. She had never considered having them use her equipment. In another case, a client had a small aquarium open to the public at anytime of day due to lack of security. Local fishermen would bring in random fish or invertebrates that they caught in nets and place them in tanks. In some aquaculture establishments you may need to prevent people that have been with other fish within 24 hours from even entering the farm or aquarium, but here that was not an option, so we compromised by focusing on what equipment would be in direct contact with the fish and in securing the premises throughout the night.

#### **Water Quality**

If an aquatic biosecurity protocol is defined as a protocol established to identify and assess hazards for fish, then there is nothing more important than assessing water quality. Usually, when veterinarians are discussing water quality it centers on the nitrogen cycle and biological filtration. For biosecurity, it is also important to look at the water source, pond history, animal and plant levels, and water treatments.

Water source (if city water, what is the city water treated with; if well water, has your well water been tested for bacteria or heavy metals; if seawater, are you testing the salinity levels regularly)?

How frequently is water added to the pond/aquarium?

How frequently is the water tested and who is testing it?

What is the water being tested for?

If there are problems with the water, what is the contingency plan?

What lived in the pond/aquarium before the fish that are present?

Has the pond/aquarium sediment been cleaned?

Have new plants been added? What is done with the plants before they are added?

Has the water been treated with any type of medication?

The type of water source is important to know what treatments were performed on the water before it entered the property, possible pathogens that might be present, and variance of salinity. At one client's facility, the water was brought in from a bay. There was a fresh water source that entered the bay in the same area where the collection pipe was located. Over time, sediment around the pipe shifted, allowing for the water source to become more fresh water than salt water. Using the bay water also allowed pathogens that were overwhelming fish in the bay to enter the aquarium. Provisions to increase salinity checks and use ozone to treat the incoming water helped decrease the risk to the aquarium.

Frequently, I have clients using city water to fill their ponds and aquariums. They may be using dechlorinators that are ineffective for the type of chlorine (or chloramine) used in the water. They may also be dechlorinating after the water is already in the tank or pond. I discuss with clients how to use a dechlorinator during water changes or when water is added to the tank and explain that any amount of chlorine or chloramine can cause damage to the fish.

Sediment in an old aquarium or pond may be a large source of hazards. In ponds that have not had sediment removed over long periods, low oxygen levels deep in the sediment may allow for anaerobic bacterial growth that can produce sulfur wells that when disturbed can cause high mortality from Hydrogen Sulfide toxicity. Sediment can also contain bacteria or encysted parasites that are waiting for the right environment to flourish. It is important to discuss how this can be corrected or avoided for the future.

### **Feeding**

The food source and how it is fed are important to avoid the transfer of disease. It is important to know if the ingredients in the food are safe for consumption and if it has enough vitamins and other nutrients to maintain optimal health.

Are the fish being fed live feed?

Are the fish being fed frozen fish?

Is the food from a source that raises and tests the food fish?

How old is the food that is being fed?

Are they feeding through cold weather periods?

### **Introduction of new animals and plants**

Most private aquariums and pond owners do not use a quarantine period when introducing new animals or plants. I explain to the owners that most disease will not show in fish until there is a significant

amount of stress on their immune system. It may take over 30 days to see the effects of that pathogen. When deciding on the quarantine length it important to consider the fish species and what diseases you might be quarantining for.

Do they have space for an isolated pond or large aquarium?

How many fish will be brought in at a time?

Will the fish be tested at multiple times through the quarantine period or just at the beginning or end?

(This will depend on the amount the owners want to spend on veterinary care. There needs to be an understanding that if fish are tested only at the end of quarantine and disease is found, the quarantine will need to go on longer while the fish are being treated.)

Will medications or prophylactic treatments be used?

### **Including veterinary care in your biosecurity protocol**

Once you have established what risk of disease the fish have, you need to review what you can do as a veterinarian to help avoid these risks. Hardfield (2011) surveyed 60 public aquariums, showing that 41% used a visual exam including testing of fish through gill biopsies, skin scrapes and fin clips in quarantined fish.

The frequency that testing occurs depends on the type of client and what their resources are. I recommend testing after a 48-hour acclimation period and at the end of quarantine for all of my clients. Clients need to be educated on the clinical signs of disease so that they can inform the veterinarian if their quarantined animals are showing signs of illness. Exams should be preformed if illness is suspected.

Vaccines may be helpful in certain scenarios. The effectiveness of the vaccines and risks involved with administering vaccines need to be reviewed with the client. Some vaccines will cause a fish to test positive for the virus or bacteria. This may prevent showing of that fish (i.e., entering into a koi show). The client may also be concerned with costs of vaccines in comparison to the cost of the disease. Before reviewing vaccines with your client, be aware of all the positive and negative aspects of the vaccine.

Many biosecurity protocols include the use of prophylactic treatments on all newly acquired fish. This should be based on the history of the aquarium and the fish that are being acquired. If the fish are acquired from a breeding facility that is testing for most transmissible diseases, then slow acclimation is the most important treatment. If the source of the fish is questionable, it may be important to consider treatment for parasites and a prolonged quarantine time.

According to C.A. Hardfield (2011), during a survey of several different sized public aquariums, it was noted that all the facilities that used prophylactic medications waited 3-4 days post-arrival to start any treatments. Most of the institutions used salinity changes with careful considerations of temperature and pH. Other treatments used included copper sulfate, chloroquine baths, organophosphates, fenbendazole, and metronidazole. Before establishing which prophylactic treatment to use, the veterinarian needs to consider species sensitivity and pathogen sensitivity to the treatment, legal plans for disposal and food withdrawal regulations. I do not use prophylactic treatments in most of my quarantine protocols due to the potential for species sensitivity to different treatments and the chance of inducing resistance of bacteria and parasites to medications if not used correctly. The following table includes treatments as described in Noga (2010).

Staying involved with the client's biosecurity protocol may be as simple as reviewing the protocol and its outcomes on a semi-annual basis. Using statistics during this review will help the client to visualize the significance of the protocol as it is being implemented. If a significant improvement has not been accomplished, then additional protocols can be added.

The odds ratio (OR) is commonly used to assess clinical trials. "The OR represents the odds that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure" (Szumilas 2010). Consider the exposure to be the absence or presence of a biosecurity (BS) protocol, where  $OR = (a/b)/(c/d)$ . The letters a, b, c, d represent pre- and post-biosecurity measure implementation and whether the animals incurred any mortalities.

Treatment	Dose	Used to Treat	Possible Side Effect/ Toxicity
Salt	3-5 PPT (0.3-0.5%)	Stabilize osmotic stress and treat some ectoparasites	Osmotic damage to the tissues if overdosed or in sensitive species
Copper Sulfate	Levels need to be maintained between 0.15 and 0.20 mg/L (must be tested daily using a commercial kit)	Ectoparasites, protozoa, monogenea, water mold, <i>Flavobacterium</i>	Very unstable and dosage depends on the pH and alkalinity of the water. Can cause damage to the gills, immunosuppression or immunostimulation, depending on the species treated.
Hyposalinity [Reducing salinity in the water for saltwater fish]	Dip: fresh water 3-15 minutes. Prolonged bath: decrease 5-10 ppt daily until reaching 16 ppt for 3 weeks. Invertebrates will not tolerate this.	<i>Cryptocaryon irritans</i> and other ectoparasites	Many species are unable to tolerate low salinity. If you are not certain of the species you are working with do not attempt hyposalinity.
Organophosphate	Trichlorfon- sea lice 15-300 mg/L at 3-18C for 15-60 minutes.  isopods 2 mg/L for 60 minutes  in ponds 0.25 mg/L	ectoparasites	Causes inhibition of acetylcholinesterase, damaging neurotransmission. It can last for several weeks in some species, with an additive effect.
Fendbendazole	Bath: 2 mg/L once weekly for 3 weeks; Orally: 25 mg/kg SID for 3 days; 50 mg/kg once weekly for 2 weeks	Non-encysted nematodes found in the gastrointestinal system	
Metronidazole	Bath: 5 mg/L for 3 hours every other day with 50% water changes between; Oral: 25 mg/kg SID for 5-10 days.	Hexamitosis, Spironucleosis	No toxic effects are listed for fish, but there are several neurologic toxicities in small animals.

OR = (a/b)/(b/d):

- a: Number of exposed cases (++) = pre-BS with mortality
- b: Number of exposed non-cases (+-) = pre-BS with no mortality
- c: Number of unexposed cases (-+) = post-BS with mortality
- d: Number of unexposed non-cases (--)= post-BS with no mortality.

Calculating a confidence interval (CI) and understanding its significance will allow the veterinarian to assess the outcome. The CI can be calculated using a natural log or by using one of several calculators that can be found on the internet. The upper and lower limits of the CI should not span across 1. They should both be above 1 or both be less than 1 to show a significant outcome.

The use of an OR will only be helpful with aquariums and ponds that have already dealt with mortality and morbidity. With wildlife and fish farms it may be possible to use other forms of statistical analysis. These require information regarding the average mortality and morbidity of the hazards you expect to encounter as seen in other populations.

In the veterinary community there is little doubt that a biosecurity protocol will improve the survival rate in any aquatic environment. It is our job to educate the clients to follow through with the advice given and communicate any concerns they have with the outcome. This paper gives an introduction that can be used to begin this communication.

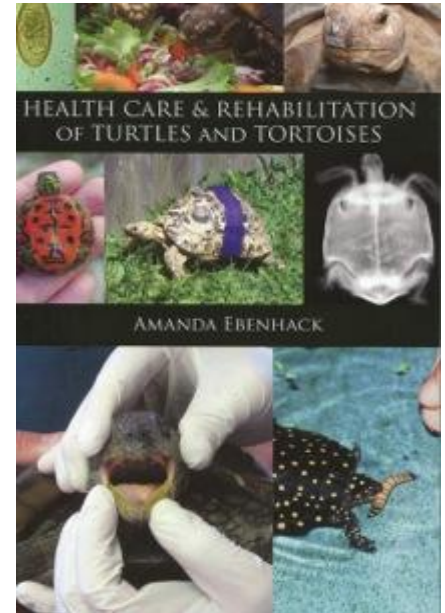
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### Book Review

#### Health Care & Rehabilitation of Turtles and Tortoises

By Amanda Ebenhack  
\$39.95;  
Soft cover,  
Pages 393.



Turtles and tortoises have been around for over 250 million years. In recent times, turtles and tortoises have been hardy and interesting family pets. These prehistoric beauties are worthy of our respect, both in captivity and in nature, particularly as it pertains to proper care, feeding, and especially when they require medical treatment.

Most incidents causing the demise of these wonderful creatures in nature result from human interference. Many are hit by automobiles, chewed on by dogs, and run over by mowers. Although some injuries may appear fatal, turtles and tortoises have amazing abilities to heal. To an inexperienced eye, many shell fractures and injuries look fatal when they are not. Many veterinarians not experienced with chelonians may euthanize an animal without even attempting rehabilitation.

In addition to a wealth of information on anatomy, captive care, diet and nutrition, and indoor and outdoor enclosure design, this book describes the medical care of injured turtles and tortoises. Also included is general first aid and supportive care for most afflictions that can befall turtles both in nature and in captivity. This exciting and informative book features the most current information on hydration, tube feeding, shell fractures and wound care, shell conditions, bacterial and viral diseases, respiratory illness, parasites, and guidelines for checking for overall wellness of injured or recovering turtles and tortoises.

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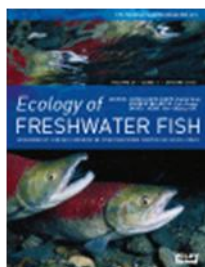
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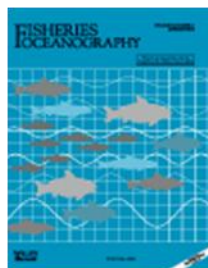
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### Book Review

#### **The Leatherback Turtle - Biology and Conservation**

Hardback, 246 pages, 9 b&w photos, 70 line drawings, 16 color plates. ISBN: 9781421417080 (2015)

Edited by James R. Spotila and Pilar Santidrián Tomillo

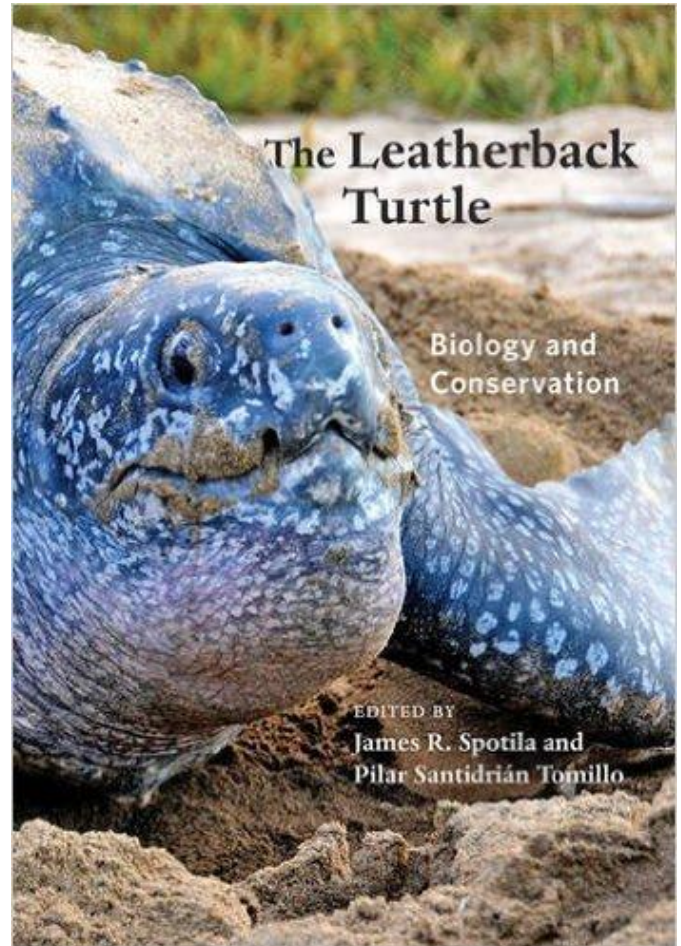
Weighing as much as 2,000 pounds and reaching lengths of over seven feet, leatherback turtles are the world's largest reptile. These unusual sea turtles have a thick, pliable shell that helps them to withstand great depths—they can swim more than one thousand meters below the surface in search of food. And what food source sustains these goliaths? Their diet consists almost exclusively of jellyfish, a meal they criss-cross the oceans to find.

Leatherbacks have been declining in recent decades, and some predict they will be gone by the end of this century. Why? Because of two primary factors: human redevelopment of nesting beaches and commercial fishing. There are only twenty-nine index beaches in the world where these turtles nest, and there is immense pressure to develop most of them into homes or resorts. At the same time, longline and gill net fisheries continue to overwhelm waters frequented by leatherbacks.

In *The Leatherback Turtle*, James R. Spotila and Pilar Santidrián Tomillo bring together the world's leading experts to produce a volume that reveals the biology of the leatherback while putting a spotlight on the conservation problems and solutions related to the species. The book leaves us with options: embark on the conservation strategy laid out within its pages and save one of nature's most splendid creations, or watch yet another magnificent species disappear.

James R. Spotila is the L. Drew Betz Chair Professor of Environmental Science at Drexel University and director of the Center for Biodiversity and Conservation. The founding president of the International Sea Turtle Society and chairman of the board of The Leatherback Trust, he is the author of *Sea Turtles: A Complete Guide to Their Biology, Behavior, and Conservation* and *Saving Sea Turtles: Extraordinary Stories from the Battle against Extinction*. Pilar Santidrián Tomillo is a Marie Curie Fellow at the Mediterranean Institute for Advanced Studies and the research director of The Leatherback Trust.

"The massive, magical leatherback remains the last ancient survivor of an otherwise now-extinct family of sea turtles. They survive as Earth's heaviest reptile and a warm-blooded one to boot. They have been called 'the largest wild animal you can walk right up to with no fear of being attacked.'



In this excellent volume, the people who have spent their lives learning more, first-hand, about leatherback turtles than anyone in history, share centuries worth of field-knowledge and deep thought. If this book was available when I was writing *Voyage of the Turtle*, I'd have written a much better book!"

— Carl Safina, author of *Beyond Words: What Animals Think and Feel*

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**AQUATIC VETERINARY ABSTRACTS: TURTLES**

Compiled by David Scarfe

**Surgical Approach to the Coelomic Cavity through the Axillary and Inguinal Regions in Sea Turtles**

Di Bello, A, C. Valastro, F. Staffieri (2006). JAVMA, 228 (6): 922-925.

**Abstract:**

*Objective*—To describe a surgical approach to the coelomic cavity through the axillary and inguinal regions in sea turtles.

*Design*—Descriptive report; Animals—9 loggerhead sea turtles (*Caretta caretta*) that had ingested fishhooks or monofilament fishing line.

*Procedure*—Turtles known to have ingested foreign bodies were anesthetized. For the extraction of fishhooks located in the stomach, an approach to the coelomic cavity through the soft tissues of the left axillary region (along the cranial margin of the plastron) was made. For the removal of fishhooks and long fishing lines in other portions of the intestinal tract, an approach to the coelomic cavity was performed via the inguinal region. Foreign bodies were removed via gastrotomy or enterotomy.

*Results*—Of the 9 loggerhead turtles, 3 had a fishhook in the stomach, 1 had a fishhook in the stomach and fishing line throughout the intestinal tract, 2 had a fishhook in the ileum and fishing line in the ileum and colon, and 3 had fishing line throughout the intestinal tract. Following surgery, 8 turtles recovered successfully; 1 turtle (in which an enterectomy was performed) died. After approximately 8 weeks, the surviving turtles were well enough to be released from captivity.

*Conclusions and Clinical Relevance*—Results indicated that an axillary approach to the coelomic cavity in sea turtles could be a useful alternative to plastron osteotomy. Moreover, the inguinal approach allows the exteriorization of the intestinal tract from jejunum to colon, which facilitates surgical removal of long linear foreign bodies ingested by turtles.

**The Chelonian Respiratory System**Bennett T (2011). In: SE Orosz & CA Johnson (eds), *Veterinary Clinics of North America: Exotic Animal Practice*, 14(2): 225-239.**Abstract**

This article reviews anatomy, physiology, diagnostic techniques, and specific disease syndromes of the chelonian respiratory system. Respiratory disease is common in chelonians and is a cause of significant morbidity and mortality in these animals. Mycoplasma, herpesvirus, and iridovirus are reviewed in depth.

**Metabolic and respiratory status of stranded juvenile loggerhead sea turtles (*Caretta caretta*): 66 cases (2008–2009)**Camacho M, MP Quintana, OP Luzardo, MD Estévez, P Calabuig & J Orós (2013). *J. Amer. Vet. Med. Assoc.*, 242 (3): 396-401.**Abstract**

*Objective*—To document venous blood gas, acid-base, and plasma biochemical values for stranded juvenile loggerhead turtles at admission to a rehabilitation facility, compare these values among stranding causes, investigate differences in these values for turtles that survived versus those that died, and establish the baseline values for successfully rehabilitated loggerhead turtles (*Caretta caretta*).

*Design*—Retrospective case series.

*Animals*—66 stranded juvenile loggerhead turtles that were hospitalized between 2008 and 2009.

*Procedures*—Venous blood gas, acid-base, and plasma biochemical values at the time of admission were compared retrospectively among turtles with different stranding causes. Initial results were compared between turtles that survived and turtles that died. Results for survivors were compared between the time of admission and time of release.

*Results*—57 (86.36%) turtles had various types of acid-base disorders at the time of admission to the rehabilitation facility. Of these, 33 (57.9%) had mixed acid-base disorders and 24 (42.1%) had primary acid-base disorders. All acid-base disorders were classified as mild to moderate, except 1 case of severe metabolic and respiratory acidosis. Except for the debilitated turtles (in which the mean initial glucose concentration was much lower than that observed for the rest of turtles), there was no difference in initial values when comparing stranding causes. Turtles that died during rehabilitation had significantly higher initial anion gap and osmolality, compared with turtles that survived.

*Conclusions and Clinical Relevance*—Acid-base disorders were present in most stranded juvenile loggerhead turtles. Evaluation of accurately obtained, temperature-corrected venous blood gas, acid-base, and plasma biochemical values can provide important clinical and prognostic information and a valuable basis for the implementation of adequate and rapid treatment for stranded loggerhead turtles admitted to rehabilitation facilities.

Know Your Sea Turtles

**SEATURTLE.ORG** **Sea Turtle Identification Key**

**Leathery, no scutes; 5 long ridges**  
Leatherback  
*Dermochelys coriacea*

**Hard carapace (shell) with large scutes (shell plates)**

**4 costal (lateral) scutes; First costal scute does not touch nuchal**

**One pair prefrontal scutes**  
Restricted primarily to the eastern Pacific Ocean; Dark pigmentation  
Black\*  
Found in tropical coastal waters of Australia  
Flatback  
*Natator depressus*

**Two pairs prefrontal scutes; overlapping scutes**  
Hawksbill  
*Eretmochelys imbricata*

**5 or 6 costal scutes; Carapace not circular**  
Loggerhead  
*Caretta caretta*

**5 or more costal (lateral) scutes; First costal scute touches nuchal**

**Carapace wide and almost circular**

**5 costal scutes; Nearly circular**  
Restricted primarily to the Gulf of Mexico and Atlantic coast of the USA  
Kemp's Ridley  
*Lepidochelys kempii*

**usu. 6 or more costal scutes**  
Found in tropical waters of the Pacific, Indian and South Atlantic Oceans  
Olive Ridley  
*Lepidochelys olivacea*

Sea turtle figures used by permission of the Marine Turtle Specialist Group ([lucn-mtsg.org](http://lucn-mtsg.org))  
Source: Pritchard, P. C. H. and Mortimer, J. A. (1993) Taxonomy, External Morphology, and Species Identification, pp. 21-88. In: Eckert, K.L., K.A. Bjorndal, F.A. Abreu-Grobois, and M. Donnelly (Editors). 1999. *Research and Management Techniques for the Conservation of Sea Turtles*. IUCN/SSC Marine Turtle Specialist Group Publication No. 4. (for further details see <http://www.lucn-mtsg.org/publications.htm>) Illustrations by Tom McFarland

**Stranded Olive Ridley Marine Turtle in Guyana**  
 By **Devon Dublin**

Background

An Olive Ridley sea turtle was rescued by a speed-boat operator in the vicinity of the Stabroek Market at the mooring point for vessels in mid-May 2011. The turtle when found, was thought to have had a hook in its mouth. What was clear was that it was discomfited and could not dive.

It was transported to the National Zoo and kept there. Dr. Nicholas Waldron made contact with WAVMA seeking assistance and guidance and providing the following information:

“The animal seems physically intact except for some areas where barnacles were scraped off and what appears to be sun burn on the rear end of her shell. She is still active, trying to resist and to escape.”

With the initial belief that the turtle was suffering from floating turtle syndrome, I started a thread of discussions in the WAMA members Listserv.

WAMA Members Listserv Discussions

There might be a couple of reasons it is floating - gut stasis with gas build up, rupture of lung with air release to body cavity, a peritonitis with gas production, some type of iatrogenic or traumatic introduction of air. Syringe and needles can be used to pull off air that might be in the body cavity. To do this, simply turn the turtle on its back and tip it cranially a bit so that intestines fall forward. Insert the needle in the soft tissue between the plastron and hind limb at a 45 degree angle or less. Since the cause is unknown administering antibiotics is recommended.

*Ilze Berzins*

Gastrointestinal stasis or ileus is a common cause of morbidity in debilitated sea turtles and should be differentiated from true obstruction. Stasis is precipitated by dehydration, foreign bodies, systemic disease, gastroenterocolitis and malnutrition. Diagnosis may be aided with radiographs, positive contrast and ultrasound.

Debilitated sea turtles often develop a secondary gastrointestinal stasis and obstruction. Chitinous debris, shell prey items and gas in the gastrointestinal tract are visible radiographically. The condition may progress to impaction and obstruction requiring intensive medical or surgical therapy but is often resolved with fluids, mineral oil and motility modifiers, such as metaclopramide and cisapride, and enemas. In general resolve the obstruction prior to feeding or tube feeding the patient, though low residue foods can be beneficial.

*Dr. Terry Norton*

Sea turtles are often presented with buoyancy disorders, unable to float normally at the surface or submerge. Any condition leading to gas or air accumulation in the intestinal tract, the coelomic cavity, or pulmonary disease may cause abnormal buoyancy. Common causes include: 1) pneumonia, 2) gastrointestinal disease (e.g. motility disorders, spinal cord injury, enterocolitis, foreign body and other obstructive processes leading to gas accumulation), and 3) free air in the coelomic cavity, which may occur from respiratory or intestinal leakage or microbial fermentation.

Diagnosis of the primary problem may include blood work, radiology, endoscopy (gastrosocopy, bronchosocopy), culture, and laparoscopy. Initially the turtle should be stabilized and then attempts should be made to treat the primary disease. Coelomic free air noted radiographically should be aspirated by tilting the turtle on its side and directing the head ventrally to bring the air pocket up to the inguinal space. An extension set, appropriate sized needle, 3 way stopcock and syringe are used to remove the air. For large quantities of air, a suction unit can be attached to remove air. Some turtles, especially those with spinal injuries, may remain abnormally buoyant for life.

Other contributor's and commenters were *Dr. Gregory Lewbart, Dr. Richmond Loh and Dr. Trista Welsh.*

Treatment and Conclusion

The turtle was kept under observation and placed on an antibiotic treatment regime which resulted in marked improvement. Subsequently the turtle was released back to the seas by the Guyana Defense Force Coast Guard.

From Wikipedia

Sea turtles (superfamily Chelonioidea) are reptiles of the order Testudines. The seven extant species of sea turtles are: the [green](#), [loggerhead](#), [Kemp's ridley](#), [olive ridley](#), [hawksbill](#), [flatback](#), and [leatherback](#).

The Olive Ridley sea turtle (*Lepidochelys olivacea*) is named for the generally greenish colour of its skin and shell, or exterior. It also known as the Pacific Ridley sea turtle, and is a medium-sized [sea turtle](#) found in warm and tropical waters, primarily in the Pacific and Indian Oceans. It is closely related to the Kemp's Ridley (*Lepidochelys kempi*), with the primary distinction being that Olive Ridelys are found only in warmer waters.

They are the smallest of the sea turtles, weighing up to 100 pounds (45 kilograms) and reaching only about two feet (65 centimeters) in shell length. The Olive Ridley has a slightly smaller head and smaller shell than the Kemp's Ridley sea turtle.



#### Further Reading and References

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Kaieteur News (2011), **Olive Ridley turtle returned to sea after intense treatment - prognosis very dim**, available at: <http://www.kaieteurnews.com/2011/06/05/olive-ridley-turtle-returned-to-sea-after-intense-treatment-prognosis-very-dim/>

Minamikawa, S., Naito, Y., Sato, K., Matsuzawa, Y., Bando, T. and Sakamoto, W. (2000), **Maintenance of neutral buoyancy by depth selection in the loggerhead turtle, *Caretta caretta***. *J Exp Biol* **203**: 2967–2975

Schmitt, T., Munns, S., Adams, L. and Hicks, J. (2013), **The use of spirometry to evaluate pulmonary function in Olive Ridley Sea Turtles (*Lepidochelys Olivacea*) with Positive Buoyancy Disorders**. *Journal of Zoo and Wildlife medicine* **44**: 645–653.

Photo Above:

"The Olive Green Ridley turtle being transported unto the Guyana Defense Force Coast Guard Vessel (MV Pirai) with intent of releasing the endangered creature to its natural habitat"

Credits: Kaieteur News

Below:

An olive ridley in Escobilla Beach, Oaxaca, Mexico.

Credits: Wikipedia



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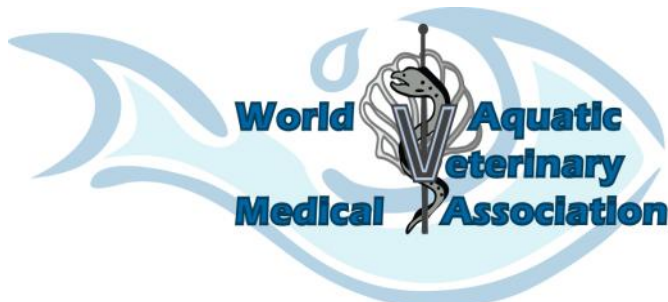
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**Veterinarian saves goldfish who swallowed a pebble**

9/19/2016

Emma Marsh, 21, of Kuraby, said she rushed her one-year-old fish to Brisbane Bird and Exotics Veterinary Service in Greenslopes after she saw him ingest the pebble and start choking.

Australian veterinarian Emma McMillan saved Conquer, a 1-year-old male goldfish who had swallowed a pebble. The fish would've starved to death if the stone was left in place, so Dr. McMillan anesthetized the 13-gram goldfish, then she used forceps to gently extract the pebble.

Veterinarian Emma McMillan said even she was surprised by the size of the pebble Conquer swallowed.

"He is 13g and only 5cm long," she said. "The pebble was about 8 or 9mm long and was stuck lengthways across the side of his mouth, which is why he couldn't spit it back out."



Picture:  
Brisbane  
Bird and  
Exotic  
Veterinary  
Service

Full Story:  
[The Courier-Mail \(Brisbane, Australia\)](#)

**Did you know?**

**WAVMA maintains an aquatic vet video library.** Currently the videos cover a wide range of topics, including surgical procedures, diagnostic methods and guidance on how to be an aquatic veterinarian.

The videos can be accessed at:  
<http://www.wavma.org/WAVMAs-Aquatic-Vet-Video-Library>

In addition, if you have a video that you would like to make available to other WAVMA members, kindly contact [WebAdmin@wavma.org](mailto:WebAdmin@wavma.org).

**Bachelor's paradise: Female turtles outnumbering males due to warming temperatures: Climate change posing long-term stability challenges for turtles**

The Journal of Experimental Marine Biology and Ecology.

Date: February 4, 2016

Source: Florida State University

Rising global temperatures may skew gender imbalance among the marine turtle population, according to new Florida State University research. Florida State University Assistant Professor of Oceanography Mariana Fuentes and a team of Brazilian researchers have been examining Brazilian loggerhead turtles to see how rising temperatures affect that species. The sex of marine hatchlings is influenced by incubating temperatures, and warmer temperatures produce a higher number of female hatchlings. Researchers believe projected increases in temperature will cause a gender imbalance in marine turtle populations and are trying to identify best practices to protect the species.

"We're concerned we're going to have a feminization of marine turtles," Fuentes said. "This study came from the need to understand the current sex ratio being produced at loggerhead nesting grounds to establish baseline parameters as climate change progresses and to identify beaches that produce a higher proportion of males."

Fuentes and her team were specifically trying to identify beaches that produce higher numbers of male turtles, so they could get a broader view of areas where imbalances were already occurring. In northern Brazil, an exceptionally strong female bias -- 94 percent -- was observed in all nesting areas used by loggerhead turtles. But, scientists were also able to identify nesting beaches in southern Brazil that were producing a higher proportion of male hatchlings -- 47 percent -- which is essential to sustain the population.

"It's worrying that you could have an extreme skew in gender one way," Fuentes said. "Any changes in population structure can have real repercussions."

The sex of marine turtle hatchlings is influenced by temperature, with optimal hatching temperatures falling between 75.2 degrees Fahrenheit to 93.2 degrees Fahrenheit. But, temperatures below 85.1 degrees tend to yield more male turtles and temperatures above that mark typically yield more female turtles. Scientists examined 25 years' worth of data for 21 nesting beaches throughout coastal Brazil, about 373 miles worth of nesting areas, making it the most comprehensive of its kind.

Though Fuentes and her team focused on Brazil, the results are applicable to other regions because all turtles have temperature-dependent sex determination. Fuentes plans to expand the research into Florida in the

coming year by examining the gender structure of loggerhead turtles in the Panhandle.

She will also be working with conservationists and government officials in Brazil to develop strategies to protect the population and ensure that the imbalance does not negatively affect the species.

Story Source:

The above post is reprinted from [materials](#) provided by [Florida State University](#).

Journal Reference:

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*The loggerhead sea turtle (Caretta caretta) is the world's largest hard-shelled turtle. Adults have an average weight range of 80 to 200 kg (180 to 440 lb) and a length range of 70 to 95 cm (28 to 37 in). The maximum reported weight is 545 kg (1,202 lb) and the longest reported carapace length is 213 cm (84 in).*



**The Recovery of the World's Most Endangered Sea Turtle Has Stalled - Six years after the Deepwater Horizon disaster, Kemp's ridley sea turtle nesting has fallen to its worst level in years.**

Mar 30, 2016 John R. Platt, <http://www.takepart.com/>

Decades of efforts to restore the Gulf of Mexico's populations of critically endangered Kemp's Ridley sea turtles have stalled and the species may be on the decline again, worrying new research reveals. Kemp's ridley sea turtles, the world's rarest sea turtle species, nearly went extinct in the second half of the last century after fishing nets devastated their populations. By 1985 the species was down to its last 200 to 250 breeding females. Habitat protection and conservation efforts helped turn that around, including the introduction of devices that allow sea turtles to escape fishing nets. Populations began rebounding during the 1990s, rising as much as 15 percent a year.

"I considered it a gold star for how you do conservation," said [Thane Wibbels](#), a professor of biology at the University of Alabama at Birmingham and one of the authors of the new study. "It restored a species that was almost literally extinct."

That recovery has now stopped. Kemp's ridley sea turtles laid eggs in just 14,000 nests last year, a 34 percent decline from 2009. Even worse, the [new research](#) — published on March 25 in the journal *Ecosphere* — finds that nesting levels are now just a fraction of what they were back in 1947, when Kemp's ridley turtles laid an estimated 120,000 to 180,000 nests. Those 1947 numbers, the first detailed calculation of historic nesting rates, reveal that the species is actually in much worse shape than previously thought. Researchers made the calculation by looking at a famous 1947 film that captured images of a mass-nesting event, called an arribada, at the species' primary nesting site in Rancho Nuevo, Mexico. Then they compared the film with nesting density rates in current arribadas, something that couldn't be done until recovery efforts allowed mass nesting to start again, to come up with an estimate of historic activity.

So why has recovery stalled? One possible explanation is the [2010 Deepwater Horizon oil disaster](#). "The Deepwater Horizon spill occurred in a very critical area for Kemp's ridley," Wibbels said. "It didn't occur in nesting beaches, but it did occur in very well-known and possibly important foraging grounds and developmental habitats."

The spill area is also an important migratory corridor: Most female turtles pass through it on their way to and from the nesting beach at Rancho Nuevo. Hatchlings, which already have a low survival rate due to predation, also travel on currents through the same region.

Another possibility is that the Gulf of Mexico may

no longer be able to support a large number of sea turtles. Wibbels pointed out that blue crabs, one of the turtles' favorite foods, are in decline in many areas of the gulf. Other prey species may also be suffering, he said. "There may not be the resources out there for these animals."

The future of the Kemp's ridley remains uncertain. "It's possible that they're going to keep going down or they could maintain themselves at this level," Wibbels said. He believes that ongoing monitoring will be necessary to understand how well the turtles are reproducing, how many are surviving, and how well the ecosystem can support them in the future, if it can continue to do so at all.

**Frozen Solid, Abused Turtle Comes to Life**

Mari A. Schaefer, *Inquirer Staff Writer @MariSchaefer*  
Posted: Tuesday, January 12, 2016



*Elsa the turtle is on the road to recovery.*

Pennsylvania SPCA image: [http://media.philly.com/images/600\\*400/rsz\\_elsa\\_2.jpg](http://media.philly.com/images/600*400/rsz_elsa_2.jpg)

Medical staff at The Pennsylvania SPCA's Shelter Hospital were sure the red-eared slider turtle brought in, still frozen in a container, was dead.

"When we looked at her there were no signs of life," said Alicia Royer, nursing supervisor. But turtles can go into a state similar to hibernation when their heart-beat can drop to one or two beats a minute, she said. Not wanting to give up, they contacted a reptile expert at the University Of Pennsylvania veterinary hospital, who suggested warmth therapy.

They placed it on a heating pad under a warming lamp and towels, waited, and kept checking. After two hours Royer picked up the reptile to remove ice from its foot, and she thought it moved. Reflex? Royer touched it's other leg. The turtle flinched. Then one eye blinked.

"She's alive, she's alive," Royer yelled to the staff. "We were all super-excited," she said.



An anonymous call alerted the PSPCA's Humane Law Enforcement officers to the turtle's plight. They discovered the reptile partially submerged in ice in a container on the porch of a row home in the 900 block of East Schiller Street in the city's Tioga section. The turtle's owners surrendered it to the officers. The PSPCA is investigating to see if criminal charges are warranted, said spokesperson Gillian Kocher.

The red-eared slider, the most common pet turtle, is native to the South Eastern USA and Mexico. It is considered an invasive species that competes with native species.

Evidently this was not the first time the turtle had suffered. It was missing toes, some of the tissue on its limbs had died off and the shell was badly damaged, Kocher said. The staff named it turtle Two-toed Tommy, a name more befitting to an organized-crime figure more than a limping turtle. But that was before they discovered he was a she.

Now named Elsa, the damage to her toes and shell hasn't stopped her from moving around. The shelter estimates the turtle to be between five and 10 years old; red-eared sliders can live up to 30 years.

Elsa still needs surgery to seal the broken shell, which will be done at Penn, Kocher said. For now she is getting round the clock attention, antibiotics, pain medications and a diet of dried shrimp, turtle food, dried cranberries, meal worms and a special protein gel, said Royer.

Read more at: [http://www.philly.com/philly/news/20160113\\_Frozen\\_solid\\_abused\\_turtle\\_comes\\_to\\_life.html#Rq7hTBVTVoKtfHCd.99](http://www.philly.com/philly/news/20160113_Frozen_solid_abused_turtle_comes_to_life.html#Rq7hTBVTVoKtfHCd.99)

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<http://www.wavma.org/CertAqV-Pgm>.



**Alien red-ear sliders greatly outnumber Japan's own turtles**  
by [Daisuke Kikuchi](#)

*The Japan Times* Staff Writer  
April 26, 2016

Invasive red-ear slider turtles now vastly outnumber endemic Japanese turtles and are causing significant stress to the ecosystem, according to the Environment Ministry. A study has put the number of red-ear sliders at 8 million, eight times the total population of endemic species.

Originally from the United States, the animals are widely kept as pets. However, they can grow to a considerable size and are often dumped in ponds and rivers when they outgrow their lodgings. The species is known in Japan as *midorigame* and in some other countries as the red-ear terrapin.



"The growing population of red-ear slider turtles would mean the depopulation of insects, fish and other turtles that live on water weeds," Masato Morikawa, an official in charge of monitoring alien species, told *The Japan Times*. "The population has gradually but continuously been increasing over the years."

The species is believed to have been introduced after World War II. From the 1970s, the animals were widely sold at *matsuri* (festivals) and pet shops. It is only one of several invasive turtle species now displacing local species.

The ministry said red-ear slider turtles have mainly colonized waterways in Kanto, Chubu and the Inland Sea areas. The entire population is estimated to consume up to 320 tons of water weeds each week. Morikawa conceded that the need to control other alien species is more pressing as they can cause harm to humans: the poisonous red-back spider and the snapping turtle, which can bite off a finger, are among the priorities.

"At this point, the red-ear slider turtles are exterminated only in areas that are extremely overpopulated, but we are strengthening measures against them," he said. The ministry plans to restrict imports, crack down on the abandoning of pets and step up culls.

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<http://www.japantimes.co.jp/news/2016/04/26/national/social-issues/alien-red-ear-sliders-greatly-outnumber-japans-turtles/#.VyjhZ00UVpR>

**How Climate Change Could Make Sea Turtles Extinct - Rising sea levels threaten to swallow up beaches that these marine animals need to nest.**

By Peter Fugazzotto

AlterNet / August 30, 2016

Sea turtles already have it bad. Egg thieves. Mile-wide fishing nets. Sea walls. Now climate change may just push them over the edge. Across the globe, sea turtle population numbers have plummeted from historical accounts of abundance. For example, leatherback populations in the Eastern Pacific have dropped by 95 percent over the last generation. And while bycatch in industrial fishing gear, coastal development and their direct harvest have played a role in their decline, climate change may be the final nail in the coffin for these gentle ocean creatures.

The impacts of climate change are already well-documented: an increase in ocean temperatures, a more acidic ocean, melting ice caps and rising sea levels. It's the last one that might be the worst for sea turtles. That's because sea turtles nest and lay eggs on beaches around the world and many of these beaches are at risk of being submerged by rising sea levels, eroding shorelines and storm surges.

You might wonder whether the pregnant sea turtles can just find other nesting beaches on which to lay their eggs. Turtles imprint at birth on the beach where they are born, and scientists are not sure yet whether they can adapt in time. But looking at climate prediction data, we can already see that some current beaches might be completely lost or nesting habitat reduced to a dangerously small amount.

For example, look at the case of the Hawaiian green sea turtle, locally called the honu. Today 90 percent of the Hawaiian greens nest on French Frigate Shoals, part of an atoll located in the Northwestern Hawaiian Islands. Since the elevation of the nesting beach on these islands is six feet above sea level, the predicted sea level rise over the next hundred years might completely inundate the honu's main nesting site.

And the Hawaiian green is not the only species at risk. Climate mapping prediction software has identified that Padre Island, Texas, the major U.S. nesting site for the endangered Kemp's Ridley sea turtle, might also be completely lost.

Other nesting beaches will erode due to climate change. In an ideal world, sea turtles might be able to follow these beaches as they retreat inland (if it not backed by a cliff). But poor coastal development policies, such as in Florida, will mean sea turtles will encounter sea walls and buildings, and have nowhere to nest.

Our strategy to protect sea turtles from rising seas must be comprehensive: prevent and reverse poor coastal development policies; make sure coastal resiliency projects are turtle friendly; in the worst cases, establish secondary nesting colonies to prevent catastrophic extinction; reduce other threats to sea turtles such as their drowning in fishing gear and illegal harvesting of eggs so baseline population numbers are not so fragile.

And, of course, we need to reduce our climate change emissions to bring carbon dioxide levels below 350 part per million and reduce ocean acidification. If we can reverse climate change, we might just give endangered sea turtles a fighting chance.

Peter Fugazzotto is the Strategic Programs Director at Turtle Island Restoration Network.

**University of Florida,  
College of Veterinary Medicine  
Guest Lecture Series  
Presentations about Sea Turtles:**

Ellen Ariel, PhD

**"Turtle Tribulations in Australia"** discussing different types of marine turtles and problems they encounter (45 minutes, given June 4, 2015).

Michelle Davis, DVM, DACZM

**"Stranding & Rehabilitation Programs"** covering an overview of Sea World's veterinary rehabilitation of marine mammal, sea turtle, avian & other species, and research programs with these animals (51 min, given Nov. 20, 2013).

<https://www.wavma.org/Recorded-Aquatic-Veterinary-Lectures-Presentations>



## HUMAN HEALTH RISKS OF EATING SEA TURTLE EGGS COULD BENEFIT SPECIES

By KIMBRA CUTLIP

SMITHSONIAN BLOG - 9/2/16

According to a new study, eating sea turtle eggs increases the health risk of heavy metal exposure in local communities in Panama and may provide a new strategy for conservation. Researchers from the Smithsonian Tropical Research Institute in Panama and McGill University collected eggs from green sea turtles (*Chelonia mydas*) and olive ridley turtles (*Lepidochelys olivacea*) from the Pacific coast of Panama, and measured the heavy metal amounts—known to cause adverse health effects in humans—the eggs contained. The study was published in June in the *Journal of Environmental Science and Health*. They found the eggs contained elevated levels of a number of heavy metals, particularly cadmium at a level that could be toxic to young children who eat 20 eggs per week or more. That consumption figure may sound high, but during egg laying season, when the turtle eggs are an easy source of protein, it is consistent with the eating habits in isolated coastal communities.

Throughout the year, thousands of female sea turtles crawl onto beaches on both sides of the Isthmus of Panama (Pacific and Caribbean) and lay eggs in the sand. The eggs are easily dug up, collected, eaten or sold by locals. Because one nest can contain as many as 100 eggs, families living near laying beaches with no refrigeration can easily exceed the safe weekly consumption of a few eggs per individual per day.

“When you are in these local communities along the coast, when it’s the season, the people eat them all the time,” says Hector M. Guzman, a marine biologist at the Tropical Research Institute. “You can buy a dozen right on the street everywhere in the countryside, and there are plenty in the market. Kids and pregnant women eat them, and people put them in their drinks at bars.”

The most damaging effects of eating so many eggs may be cumulative, Guzman explains. “It might not be that something is going to happen in one or two weeks, or in one season,” he adds. “But if you do that every year of your life, you are bio-accumulating these metals into your tissues.”

Heavy metals tend to stay in a person’s body, accumulating in fatty tissues over a lifetime. Heavy metals consumed in turtle eggs are added to the normal daily

intake of these toxins from fish, seafood and other environmental sources. Sea turtle eggs may contribute a significant amount of these toxins. In the case of cadmium, average consumption rates can account for more than 30 percent of safe intake levels set by the World Health Organization, especially in young people from the age of five through young adulthood

Long-term exposure to cadmium can cause kidney and skeletal problems in humans. The researchers also found elevated levels of mercury, arsenic, manganese, iron, copper and zinc in the turtle eggs. The effects of these heavy metals on humans range from neurological damage, reproductive health problems and various forms of cancer.

The effect of these toxins on the turtles remains unknown, although it is presumed to be just as detrimental. The presence of toxins in the marine environment has grown dramatically in recent decades from mining runoff, industrial emissions and batteries and paints. Sea turtles the world over have been found to have elevated levels of heavy metals in their bodies, which could be having a negative impact on their health and reproductive rates. A more immediate threat to the turtles, however, comes from direct human activity such as hunting, entanglement in fishing gear and the raiding of sea turtle nests.

Although collecting turtle eggs is mostly prohibited throughout the tropical eastern Pacific, including Panama, poaching is rampant and contributes to the dwindling numbers of many sea turtle species. According to the International Union for Conservation of Nature, olive ridley turtles are listed as vulnerable and green turtles as endangered.

Conservation efforts have increased awareness of the problem, but among rural coastal communities, these campaigns have made limited progress. “Back in the ’70s, when I was a student in Costa Rica, the practice of conservation campaigns was to produce coloring books to teach the kids to conserve, or to teach about beautiful turtles in danger,” Guzman says. “Now, four decades later and after a huge international effort, honestly, I don’t think we have succeeded in protecting the turtles.”

He hopes this study will open a dialogue about public health that might be more effective at conserving sea turtles by reducing demand for their eggs. “We need more data of course; this is just preliminary while we continue working in the Caribbean, but it is suggesting that we should be careful about eating the eggs,” he says. “I am a scientist, not a conservationist, but to me, it says talking about public health might be an ideal approach to the conservation of sea turtles.”

<http://insider.si.edu/2016/09/human-health-risks-of-eating-sea-turtle-eggs-could-benefit-species/>

**Diamondback terrapins, popular Asian meat, now off limits**

Associated Press

July 15, 2016

TRENTON, N.J. (AP) --

Diamondback terrapins, native North American turtles known for living in salty marshes along the coast and sometimes falling victim to auto traffic during the shore's busy summer months, can no longer be hunted or harvested in the state. Republican Governor Chris Christie signed legislation from the Democrat-controlled Legislature in response to a growing commercial market for terrapin meat, particularly in the Asian food market, where the meat is traditionally viewed as a symbol of longevity.

"Today we join other Atlantic coastal states that have taken an important step to prevent this unique species from any further decline toward extinction," Christie said in a statement. "The diamondback terrapin is a natural treasure and integral part of our coastal landscape in New Jersey, and this action will help to ensure the species remains a feature of our natural landscape for generations to come."

Though the terrapins have not been listed as endangered or threatened in New Jersey, the state Department of Environmental Protection considers their population to be decreasing. The DEP said it's planning an investigation into how many of them are left and what their habitat needs are.

Under previous law, the terrapins could be harvested in the winter months when they were hibernating, but the DEP ended the season early this year because of concerns over their populations.

It's not just the harvesting that's threatening the terrapins, though. The Wetlands Institute estimates that about 500 terrapins are killed by vehicles every year in Cape May County alone. The causeways that connect the mainland to the barrier islands are ideal nesting areas, with plenty of sun. They also happen to be traffic-heavy areas that result in the creatures getting hit and killed by passing cars, Wetlands Institute research scientists Brian Williamson said.

**Proposed Endangered Species Status For Sonoyta Mud Turtle**

AGENCY: US Fish and Wildlife Service, Interior.

ACTION: Proposed rule. Federal Register Volume 81, Number 183 (Wednesday, September 21, 2016)]

[Proposed Rules]

[Pages 64829-64843]

From the Federal Register Online via the Government Publishing Office [[www.gpo.gov](http://www.gpo.gov)]

[FR Doc No: 2016-22754]

**SUMMARY:** The U.S. Fish and Wildlife Service proposes to list the Sonoyta mud turtle (*Kinosternon sonoriense longifemorale*), a native subspecies from Arizona in the United States and Sonora in Mexico, as an endangered species under the Endangered Species Act. The effect of this regulation will be to add this subspecies to the List of Endangered and Threatened Wildlife.

**DATES:** We will accept comments received or post-marked on or before November 21, 2016. Comments submitted electronically using the Federal eRulemaking Portal (see ADDRESSES below) must be received by 11:59 p.m. Eastern Time on the closing date. We must receive requests for public hearings, in writing, at the address shown in FOR FURTHER INFORMATION CONTACT by November 7, 2016.

**ADDRESSES:** You may submit comments by one of the following methods:

(1) Electronically: Go to the Federal e-Rulemaking Portal: <http://www.regulations.gov>. In the Search box, enter FWS-R2-ES-2016-0103, which is the docket number for this rule making. Then, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rules link to locate this document. You may submit a comment by clicking on "Comment Now!"

(2) By hard copy: Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: FWS-R2-ES-2016-0103; U.S. Fish & Wildlife Service Headquarters, MS: BPHC, 5275 Leesburg Pike, Falls Church, VA 22041-3803.

We will post all comments on <http://www.regulations.gov>. This generally means that we will post any personal information you provide us (see Public Comments below for more information).

**FOR FURTHER INFORMATION CONTACT:**

Steve Spangle, Field Supervisor, U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office, 9828 North 31st Ave. #C3, Phoenix, AZ 85051-2517, by telephone 602-242-0210 or by facsimile 602-242-2513.

Go to <https://www.gpo.gov/fdsys/pkg/FR-2016-09-21/html/2016-22754.htm> for the following information:

- Executive Summary
- Information Requested
- Public Comments
- Public Hearing
- Peer Review
- Previous Federal Action
- Background
- Summary of Biological Status and Threats
- Table 1--Historical and Current Population Data of the Sonoyta Mud Turtle

### 500 star turtles seized at Chennai airport

By M Sathish | Express News Service  
July 29, 2016

CHENNAI, INDIA: In a major seizure, the customs and wildlife crime control bureau on Thursday night seized 500 star turtles at the Chennai airport that was being smuggled to Malaysia in a Thai Airways flight. The cute little star turtles, known for its beautiful ornate design on the shell, is one of the most common targets for smugglers due to its high demand as a pet and medical purposes across the world.

The Thai Airways officials grew suspicious when they found something suspicious moving inside the thermocool boxes that were to be uploaded as cargo in the flight. They alerted the customs, who opened the boxes and found nearly 500 star turtles bundled in cloth bags. The wildlife crime control bureau officials also confirmed that they are star tortoise, whose export is banned. In each of the cloth bag, about ten tortoise were bundled and they were placed inside the thermocool boxes.

The exporter, identified as Cosmic Exports with office at Ambattur in Chennai, had declared that the consignment contains crab. The export company's owner has been identified as one Rajavelan and further investigations are on if the company was involved in the smuggling or some other middlemen were involved. An airport source said the under the Risk Management System, a few of the parcels meant for export would go unchecked and this is how the consignment containing the star turtles had made its way up to the air craft.

The value of the 500 turtles is estimated to be around Rs 50 lakh in international market. According to sections 9, 38 and 48A of Wildlife Protection Act 1972 the export of the star turtle is illegal. Sources in the Wildlife Crime Control Bureau said nearly 10 such seizures of star turtle being exported to other countries are seized in south India. The officials are now facing a challenge on where to preserve the star turtle as the Vandalur zoo or the forest department does not have facility for it.

From Wikipedia:



*The Indian star tortoise (Geochelone elegans) is found in dry areas and scrub forests in India and Sri Lanka.*

### Alligator Snapping Turtle One Step Closer to Endangered Species Protection

Largest Freshwater Turtle in North America Threatened by Ongoing Habitat Destruction Across Midwest, Southeast

Press Release from Center for Biological Diversity, August 30, 2016

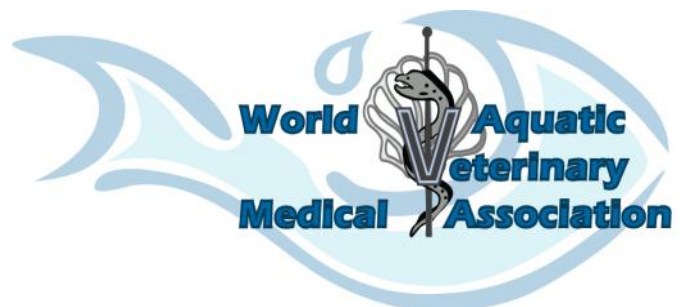
ST. PETERSBURG, Fla.— The Center for Biological Diversity today reached a settlement with the U.S. Fish and Wildlife Service requiring the agency to determine by 2020 whether the alligator snapping turtle will receive protection under the Endangered Species Act. A prehistoric-looking freshwater turtle known for its spiked shell, large claws and strong, beaked jaws, the alligator snapper has declined up to 95 percent across its historic range. In response to a 2012 petition from the Center, the Fish and Wildlife Service determined last year that the alligator snapping turtle may warrant federal protection.

“Alligator snapping turtles are disappearing from many of the areas they historically lived,” said Elise Bennett, a Center attorney whose work is dedicated to protecting rare reptiles and amphibians. “The evidence is strong these freshwater giants need Endangered Species Act protection to survive.”

Habitat degradation and over-harvest have caused significant population declines for the once-abundant turtle. Early in the 20th century alligator snapping turtles were plentiful in U.S. river systems draining into the Gulf of Mexico, from the waterways and lakes of the upper Midwest to the swamps and bayous of Florida, Louisiana and Texas. But recent population surveys show the turtles are now likely extirpated in Iowa, Illinois, Kentucky, Missouri and Tennessee. A 2014 study revealed that the alligator snapping turtle is actually three different species and therefore even more critically endangered than previously thought.

“This settlement is a welcome first step,” said Bennett. “Now the Service needs to evaluate and act according to the best science we have, which shows that these three species deserve full Endangered Species Act protection.”

Contact: Elise Bennett, (727) 755-6950;  
[ebennett@biologicaldiversity.org](mailto:ebennett@biologicaldiversity.org)





### MEETINGS OF INTEREST TO AQUATIC VETERINARIANS

Veterinarians attending these meetings may be awarded veterinary CE/CPD credit towards annual re-licensure or re-registration to practice veterinary medicine. Individuals should check with the organizers to see if CE/CPD certificates are provided.

### 2017 AQUAVET® I & II & III

The College of Veterinary Medicine at Cornell University is pleased to announce the 2017 AQUAVET® I, II & III course offerings. They are aquatic veterinary medicine education programs that currently consist of two courses that will be presented at Roger Williams University in Bristol, Rhode Island, USA in June 2017 and one on aquarium medicine held in three venues.

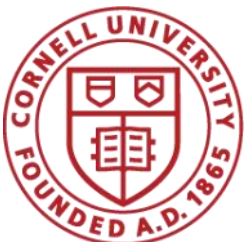
**AQUAVET® I: An Introduction to Aquatic Veterinary Medicine** is a 4-week course (28 May - 24 June 2017) intended primarily for veterinary students.

**AQUAVET® II: Comparative Pathology of Aquatic Animals** is a 2-week course (28 May - 10 June 2017) that is oriented toward the pathology of diseases of aquatic invertebrates and fish that are used in biomedical research, encountered in display aquaria and are of importance in commercial aquaculture.

**AQUAVET® III: Clinical Aspects of Captive Aquatic Animal Medicine** is a 5 week course (following AQUAVET® I: 25 June - 30 July 2017) and is limited to a small number of students. The venues include GA Aquarium, U of GA and Dolphinaris, Cancún, México.

Veterinary students can receive credits for the courses and graduate veterinarians can receive CE credits.

More detailed information and applications for admission (due by January 15, 2017) are available on the web site [www.aquavet.org](http://www.aquavet.org).



### 4th International Symposium on Ranaviruses

June 7-10, 2017  
Budapest, Hungary



Planning is currently underway for the 4th International Symposium on Ranaviruses, which will take place from June 7th to June 10th, 2017 in the beautiful city of Budapest, Hungary. The venue of the meeting is the historical campus of the University of Veterinary Science, in the heart of the city of Pest. The meeting will include a joint day with the 10th International Symposium on Viruses of Lower Vertebrates (ISVLV), which will take place from June 4th to 7th. Field trips are planned at the end of the meeting, with excursions to nearby local nature reserve areas.

Check out the conference website at <http://www.rana-2017.com/>

If you have any questions or want to help, please contact Rachel Marschang  
([marschang@laboklin.com](mailto:marschang@laboklin.com) <<mailto:marschang@laboklin.com>>)

All the best,  
Dr. Amanda L. J. Duffus, BSc.H. (SSP, Biology), MSc., Ph.D.  
Associate Professor of Biology  
Secretary/Treasurer of the Global Ranavirus Consortium  
Undergraduate Research Symposium - Chair  
Department of Biology and Physical Sciences  
Gordon State College  
University System of Georgia  
419 College Drive  
Barnesville, GA 30204  
USA

Tel: (678) 359 - 5464/Fax: (678) 359 - 5878  
Email: [aduffus@gordonstate.edu](mailto:aduffus@gordonstate.edu) <<mailto:aduffus@gordonstate.edu>>  
Office: Instructional Complex (IC) 227

Web Page: <http://www.gordonstate.edu/Faculty/aduffus/>



[Aquatic Veterinary e-Learning](#)  
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**Latin American & Caribbean Aquaculture 2016**

November 28 – December 1, 2016

Lima, Peru

Innovative Aquaculture under Environmental Challenges is the theme for this event. LACQUA16 will be the [annual meeting](#) of the Latin American & Caribbean Chapter of the World Aquaculture Society. LACQUA16 will be held in the Sheraton Convention Center in Lima, Peru.

Find the program grid [here](#). Presentations can be in Spanish, Portuguese and English.

There are still a few [booths available](#) contact [Mario@marevent.com](mailto:Mario@marevent.com). List of [exhibitors](#).

This event is supported by the Peruvian Government, Ministry of Produce, IMARPE and is Gold sponsored by Nicovita - [Vitapro](#).

**Aquaculture America 2017**

Feb. 19-22, 2017

San Antonio, USA

AA 2017 returns to one of the favorite tourist spots in the world for the only [major national aquaculture conference](#) and [exposition](#) held in the U.S. The U.S. Aquaculture Society (formerly U.S. Chapter of WAS) joins with National Aquaculture Association and the Aquaculture Suppliers Association to produce the annual Aquaculture America meetings. These sponsors are joined by the annual meetings of Aquacultural Engineering Society, American Tilapia Association, Striped Bass Growers Association, US Trout Farmers Association, US Shrimp Farming Association and many more associations to make Aquaculture America 2017 the one meeting in the U.S. that you don't want to miss! [www.was.org](http://www.was.org).

**5th Euro Global Summit on Aquaculture & Fisheries**

March 30-April 1, 2017

Madrid, Spain

The theme is "Recent Advances in Aquaculture & Fisheries". Luci Radcliff, Program Manager, Aqua Europe-2017, 2360 Corporate Circle, Suite 400, Henderson, NV 89074-7722, USA.

**World Aquaculture 2017**

June 27-30, 2017

Cape Town, South Africa

The International Aquaculture Conference and Exhibition in 2017 will be held in Cape Town, South Africa. This is the International Annual event organized by the World Aquaculture Society and moving around the globe. WA17 brochure [here](#).

The WA17 committee likes to invite all African producers and other Aquaculture associations to hold their annual meeting, to organize an industry session, during WA17. Please contact [Mario@marevent.com](mailto:Mario@marevent.com) for more information.

Time to submit [your abstract](#). [Booths](#) available, just contact [mario@marevent.com](mailto:mario@marevent.com).

**Asian-Pacific Aquaculture 2017**

July 25-27, 2017

Kuala Lumpur, Malaysia

Asian-Pacific Aquaculture 2017 is the place to learn about the latest in aquaculture, see the newest technology in the trade show with exhibits from around the world and enjoy the many tourist sites in Malaysia. APA 2017 will have a large exhibition featuring international companies showcasing the latest in products, services and all aquaculture related information. Click here for [more details](#).

Don't miss this opportunity to see the items that will enhance your aquaculture operation. [Booths](#): contact: [mario@marevent.com](mailto:mario@marevent.com). More info on [www.was.org](http://www.was.org).

**Aquaculture Europe 2017**

October 17-20, 2017

Dubrovnik, Croatia

EAS and our Aquaculture Europe 2017 event will be held in Dubrovnik, Croatia from October 17-20 next year. We will very soon be making the web page for AE2017. Meanwhile you can see the AE2017 brochure at [http://www.easonline.org/images/stories/Meetings/AE2017/AE2017\\_flyer\\_web.pdf](http://www.easonline.org/images/stories/Meetings/AE2017/AE2017_flyer_web.pdf). Kind regards, Alistair Lane - Executive Director, European Aquaculture Society



## World Veterinary Congress to be an Annual Event

In its July conference call, the WVA Council approved the proposal from the Standing Committee for the World Veterinary Congress to hold the WVC as an annual event. Following the 33rd World Veterinary Congress that will take place in Incheon, Korea on 27-31st August 2017, the WVA Council agreed to hold the 34<sup>th</sup> WVC in Barcelona, Spain in April 2018. WVA and Korean Veterinary Medical Association already started to prepare the WVC in Korea in 2017. Please save the WVC 2017 date in your diary.

**SeaWorld (3-4 weeks)**

SeaWorld offers externships at each of its 3 locations. There is one common application where you rank each park. Externs get to work with the wild birds that are brought for rehabilitation, even surgery! You are required to give a small presentation to the veterinary staff on the last week of your rotation. Housing is not provided, but there are lots of hotels in the area, including an extended stay hotel with a small kitchenette for around \$50/night.

**The Marine Mammal Center (3-4 weeks)**

Located in Sausalito, CA, the Marine Mammal Center is in the front-running for marine mammal rehabilitation and research. It is very seasonal, with more animals in the spring and summer. You will work with the veterinary staff 3-4 days per week, and then on crew, doing basic husbandry and feeding once or twice a week. Housing is provided with the veterinary intern and any other externs at one of the old fort houses nearby. It is highly recommended that you get a car for driving around. It is a beautiful area with lots of beach coast and hiking.

**Mystic Aquarium**

Mystic Aquarium in Mystic, CT, right near the coastal Rhode Island border, houses a large collection of marine mammals, fish and invertebrates. You work primarily with the veterinary intern, shadowing and assisting on procedures. You will also get very proficient in taking and processing analog radiographs. A presentation is required during this externship. No housing is provided, but you may want to ask if they know of anyone working at the aquarium who can provide you with a room for the time you are there. This is another rotation where you'll want a car to check out all the beaches nearby.

**Georgia Aquarium**

Atlanta, Georgia

Georgia Aquarium is one of the newest aquariums in the US. It has a new procedure suite and one of the most outstanding tanks in the world. Housing is not provided. You may not need a car since the aquarium is located in downtown Atlanta, GA.

**Navy Marine Mammal Program (4 weeks)**

The US Navy trains marine mammals to perform tasks underwater that cannot be performed by humans. This is a high priority for those interested in marine mammal medicine. This program is based in San Diego, CA and is highly competitive.

**Vancouver Aquarium (2-4 weeks)**

Located in Stanley Park of Vancouver, Canada, Vancouver Aquarium takes externs to work with their collection of mammals, birds, amphibians, reptiles and fish. A literature review project is required. Housing is not provided but they provide a guide on their website. Make sure your passport is up to date!

**Georgia Sea Turtle Center (2-6 weeks)**

The Georgia Sea Turtle Center is located on Jekyll Island along the southern coast of Georgia. They rehabilitate both sea turtles and native land turtles at their center. If turtles are your interest, this is one of the best facilities to participate in the latest research and rehabilitation techniques. A research project is required for non-4th year students that is financed by funding through your school. Housing available based on seasonality. A car is recommended.

**National Aquarium (6-8 weeks)**

Baltimore, MD

National Aquarium is located in Baltimore, MD and houses a large collection of fish, mammals, amphibians/reptiles and birds. This rotation gives hands-on experience with fish, birds, reptiles and amphibians. There is some work with mammals and other critters, but it is largely observational. Applications are accepted year round. A small presentation is required. No housing is available but there are lots of hotels in the area.

**New England Aquarium (6-8 weeks)**

Boston, MA

Located in Boston, MA, the New England Aquarium hosts a large collection of fish, birds, marine mammals and turtles. Their chief veterinarian, Dr. Charles Innis, is one of the most knowledgeable about cold stun in turtles and has made a significant contribution to researching their rehabilitation. Externs are required to prepare a case report and research paper with presentations for both. No housing is available, but there are lots of options nearby.

**See list of externships on the WAVMA website at:**

[www.wavma.org/externships](http://www.wavma.org/externships)





**Seattle Aquarium  
Staff Veterinarian**

- Posted:** Open to internal and external applicants
- Reports to:** Director of life sciences
- Status:** Full-time, salaried, benefitted position
- Hours of work:** Monday–Friday, standard work week with flexibility for evenings and weekends as required
- Date needed:** ASAP
- Posting expires:** Thursday, October 6, 2016

**About the Seattle Aquarium:** The Seattle Aquarium is owned by the City of Seattle and under non-profit management. The Aquarium currently serves over 825,000 visitors and 40,000 schoolchildren and their teachers annually. Guided by its mission of *Inspiring Conservation of Our Marine Environment*, the Seattle Aquarium has a realistic plan for phased growth based on record-setting attendance, membership and fundraising growth, an energized board of directors and professional management. The current annual budget is \$16 million.

**Position description:** The Seattle Aquarium seeks a staff veterinarian to join our team. The staff veterinarian furthers our mission by supporting the life sciences department through delivering a complete program of veterinary care for the Seattle Aquarium. This includes but is not limited to evaluating nutrition programs and diet formulations and providing clinical diagnostics and treatment for the Aquarium’s animal collection. Effective communication skills are necessary to ensure working collaboratively with internal and external stakeholders at all times and upholding the values and goals of the Seattle Aquarium. The current collection includes sea otters, harbor seals, northern fur seals, river otters, alcids, shorebirds, warm- and cold-water fish and invertebrates.

The staff veterinarian is responsible for refining and maintaining a complete program of veterinary care for the Seattle Aquarium, requiring organizational skills as well as effective oral and written communication skills. The ideal candidate will be self-motivated and possess strong interpersonal, collaboration and leadership skills. A DVM or equivalent degree from an AVMA-accredited veterinary

college and a minimum of two years of practical experience in veterinary medicine, preferably at an AZA accredited aquarium/zoo, are required. The staff veterinarian must also have and maintain a Washington state veterinary license and a federal DEA license.

For a full job description including working conditions and job requirements visit our website at [SeattleAquarium.org/jobs](http://SeattleAquarium.org/jobs).

**Salary and benefits:** D.O.E. Please include salary requirements in cover letter. Full-time staff are eligible for the Seattle Aquarium’s comprehensive benefits package to include medical, vision, dental, HRA, FSA, life insurance, short- and long-term disability, long-term care, access to a subsidized ORCA pass, and paid time off.

**How to apply:** The Seattle Aquarium is a progressive, equal opportunity employer that values a diverse workforce. All candidates are encouraged to apply by sending a one-page letter of interest, résumé and salary requirements to [jobs@seattleaquarium.org](mailto:jobs@seattleaquarium.org). Application review will begin immediately.

Note: Must pass a background check to be eligible for this position.

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Core to our growth and success is our Total Aquaculture Health offering. This holistic approach to the prevention, diagnosis and treatment of disease in aquaculture, combined with our extensive clinical experience, allows us to provide strategic health management advice – from farm through to boardroom level.

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Find out more about our products and services email: [enquiries.aq@fishvetgroup.com](mailto:enquiries.aq@fishvetgroup.com)

**Our Locations:**  
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350 Commercial Street, Portland, Maine, United States  
Unit 7b Oranmore Business Park, Oranmore, Co. Galway, Ireland  
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