

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/329705956>

# Timing of Nest Emergence in Kemp's Ridley and Leatherback Hatchlings

Poster · April 2017

CITATIONS

0

READ

1

4 authors, including:



**Ricardo Tapilatu**

University of Papua, Manokwari - Indonesia

65 PUBLICATIONS 302 CITATIONS

[SEE PROFILE](#)



**William G. Iwanggin**

WWF Indonesia

10 PUBLICATIONS 32 CITATIONS

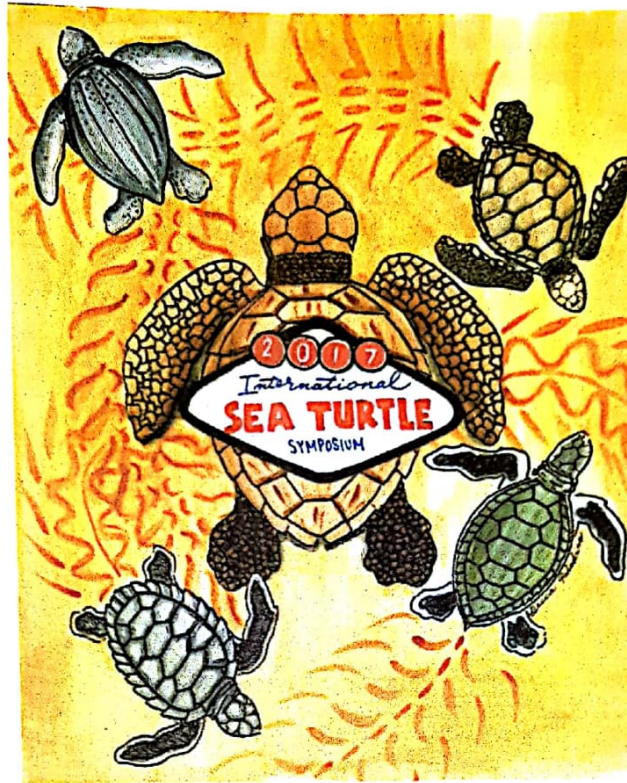
[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Pacific leatherback and Global climate change [View project](#)

# 2017 INTERNATIONAL SEA TURTLE SYMPOSIUM



## PROGRAM

**37<sup>th</sup> Annual Symposium on Sea Turtle  
Biology and Conservation  
Las Vegas, Nevada, USA  
15 – 20 April 2017**





## SYMPOSIUM AT-A-GLANCE

Friday, April 14	Saturday, April 15	Sunday, April 16	Monday, April 17	Tuesday, April 18	Wednesday, April 19	Thursday, April 20
On-site Registration 3pm - 7pm Marquis Foyer	On-site Registration 8am - 7pm Marquis Foyer	On-site Registration 8am - 7pm Marquis Foyer	On-site Registration 8am - 7pm Marquis Foyer	On-site Registration 8am - 5pm Marquis Foyer	On-site Registration 8am - 3pm Marquis Foyer	Registration closes 12pm Marquis Foyer
	Silent Auction: Items drop-off 9am - 5pm Grand Ballroom	Silent Auction: Items drop-off 9am - 5pm Grand Ballroom	Silent Auction 9am - 5pm Grand Ballroom	Silent Auction 9am - 5pm Grand Ballroom	Silent Auction 9am - 1:30pm Grand Ballroom	Exhibitors/Vendors Close 1pm Grand Ballroom
	3rd Workshop on East Pacific Leatherback 9am - 6pm Andalucia	State of The World's Turtles Workshop 9am - 6pm Marquis 1	Epibiont Workshop 8am - 12pm Marquis 8	Morning: Opening Remarks 9am Marquis Ballroom	Morning: Concurrent Sessions Marquis 1-4 and Marquis 5-8	Posters Taken Down by: 1pm Grand Ballroom
		8th Medicine Workshop 1pm - 5pm Marquis 2	Student Grant Writing Workshop 1pm - 5pm Marquis 8	Morning: Keynote address Marquis Ballroom	Morning: Concurrent Sessions Marquis 1-4 and Marquis 5-8	Morning: Concurrent Sessions Marquis 1-4 and Marquis 5-8
		Int'l Tortoise and Freshwater Turtle Mini Symp 9am - 6pm Andalucia	RETOMALA Regional Meeting 9am - 6pm Cataluna	Morning: General Session Climate Change Marquis Ballroom	Afternoon: Concurrent Sessions Marquis 1-4 and Marquis 5-8	Morning: Concurrent Sessions - Closing Remarks Marquis 1-4 and Marquis 5-8
		Environmental Education Workshop 9am - 6pm Murcia	Africa Regional Meeting 9am - 6pm Andalucia	Afternoon: Concurrent Sessions Marquis 1-4 and Marquis 5-8	Afternoon: Concurrent Sessions Marquis 1-4 and Marquis 5-8	ISTS Business Meeting 2:30pm - 4:30pm Marquis Ballroom
		Application for Photo ID (PID) and Emerging Tracking Technologies Workshop 9am - 6pm Marquis 3	Mediterranean Reunion 8am - 12pm Murcia	Poster Viewing 9am-7pm Meet the Poster Authors 5pm - 7pm Grand Ballroom	Poster Viewing 9am-7pm Meet the Poster Authors 5pm - 7pm Grand Ballroom	Farewell Banquet Awards Ceremony 7pm - 11pm Valencia Ballroom
		Light Management on Nesting Beaches- Identify, Evaluate, Plan, Execute Workshop 8am - 12pm Marquis 6	IOSEA Regional Meeting 8am - 12pm Marquis 6	Exhibitors/Vendors 9am - 7pm Grand Ballroom	Exhibitors/Vendors 9am - 7pm Grand Ballroom	
		TSD in marine turtles: from biochemistry to ecology and climate change Workshop 1pm - 5pm Marquis 6	Oceania/Pacific Islands Regional Meeting 1pm - 5pm Marquis 6	MTSG Meeting 5:30pm-7pm Cataluna	Speed Chatting with the Experts 5pm-7pm Andalucia	
		Beyond Satellite Systems Workshop 8am - 12pm Marquis 7	ICAPO Regional Meeting 8am - 12pm Marquis 7	ISTS BoD Meeting 6pm - 11pm Andalucia	Live Auction 8pm - 12am Marquis Ballroom	
		Use of UAVs in Sea Turtle Conservation and Research Workshop 1pm - 5pm Marquis 7	East Asia Regional Meeting 1pm - 5pm Marquis 7	Video Night 8pm - 11pm Marquis Ballroom		
		Sea turtles and Marine Debris Workshop 8am - 12pm Marquis 8	Poster Session set up 3pm - 6pm Grand Ballroom			
		Hawksbill products in Latin America and the Caribbean Workshop 1pm - 5pm Marquis 8	Exhibitor/Vendor setup 3pm - 6pm Grand Ballroom			
			Student Social Mixer 6pm - 7pm Lodge at the Lawn			
			Welcome Social 7pm - 9pm Lodge at the Lawn			

- 175 \**Lepidochelys olivacea* EMBRYONIC DEVELOPMENT AND NEST MICROENVIRONMENT MODELS AND INTERPRETATIONS AT OSTIONAL NATIONAL WILDLIFE REFUGE, COSTA RICA  
Jean Wai Jang | Roldán A. Valverde | Marc Girondot
- 176 LONG-TERM MONITORING AND PROTECTION OF A RARE NESTING POPULATION OF HAWKSBILL SEA TURTLES (*ERETMOCHELYS IMBRICATA*) ON MAUI: TRENDS AND DEVELOPMENTS FROM 21 YEARS OF RESEARCH  
Luke Sundquist | Suzanne Canja | Hannah Bernard | Bill Gilmartin
- 177 EFFECTS OF MATERNAL ORIGIN, MORPHOLOGY AND INCUBATION TEMPERATURE ON THE SWIMMING PERFORMANCE OF OLIVE RIDLEY TURTLE (*Lepidochelys olivacea*) HATCHLINGS  
Miriam S. Mueller | Alberto Abreu-Grobois
- 178 REPRODUCTIVE ECOLOGY OF OLIVE RIDLEY SEA TURTLES (*Lepidochelys coriacea*) FROM A NON-ARRIBADA NESTING POPULATION NEAR ZIHUATANEJO, GUERRERO, MEXICO  
Damaris Marin-Smith | Marlet A. Luna | Felipe C. Crispin | Gene Smith | Andrew T. Coleman | Alan Rodriguez | Jorge Felix | Jesus Abeldano | Fernando Lopez | Angelica CS Alicia | Tanya Lopez | Ma. Jesus Montor | J. Enrique Marin
- 179 \*PRIME REAL ESTATE: NEST PLACEMENT AND ITS EFFECT ON HATCHING SUCCESS IN LOGGERHEAD AND GREEN SEA TURTLES  
MacKenzie Tackett | Katrina Phillips | Gustavo Stahelin | Kate Mansfield
- 180 EFFECTS OF WEATHER EVENTS ON INCUBATION PERIODS IN GREEN SEA TURTLES NESTS IN TORTUGUERO NATIONAL PARK, COSTA RICA  
Alejandra Carvallo
- 181 TYPHOON DOLPHIN: PRE-AND POST-DISTURBANCE NESTING SEASONS HIGHLIGHT NESTING HABITAT PREFERENCES OF CHELONIA MYDAS ON ANDERSEN AIR FORCE BASE, GUAM  
Jessica DeBlieck | MaryLou Staman | Joshua J. Salas | Jennifer Cruce Horeg | Terry J. Donaldson
- 182 \*HOW DOES BEACH NOURISHMENT AFFECT HATCHING SUCCESS IN GREEN AND LOGGERHEAD SEA TURTLES?  
Kayla Burandt | Gustavo Stahelin | Katrina Phillips | Jake Kelley | Kate Mansfield
- 183 RELATIVE PERIOD OF TEMPERATURE SENSITIVITY IS DEPENDENT UPON SPECIFIC INCUBATION TEMPERATURES  
Taylor Roberge | Thane Wibbels
- 184 TIMING OF NEST EMERGENCE IN KEMP'S RIDLEY AND LEATHERBACK HATCHLINGS  
Amy N. Bonka | Thane Wibbels | Ricardo F. Tapilatu | William G. Iwanggin | Hengki Wona | Yairus Swabra | Zadrak Woisiri | Riki Mayor | Gideon Waroy | ... | Francisco Illescas | L. Jaime Pena | Patrick Burchfield
- 185 USING 30 YEARS OF NESTING DATA TO INVESTIGATE CONSERVATION EFFORT SUCCESS ON BALD HEAD ISLAND, NORTH CAROLINA  
Brooke Milligan | Emily Hardin | Chris Shank
- 186 †IMPACTS OF BEACH RENOURISHMENT ON NESTING TRENDS OF LOGGERHEAD SEA TURTLES (*CARETTA CARETTA*) ON BALD HEAD ISLAND, NORTH CAROLINA  
Emily E. Hardin | Brooke Milligan | G. Christopher Shank
- 187 BEACH EROSION AND LEATHERBACK TURTLE REPRODUCTIVE SUCCESS IN PACUARE NATURE RESERVE, COSTA RICA  
Renato Bruno | Nerine Constant

Presenting author: Amy N. Bonka  
Presenting author email: [abonka@uab.edu](mailto:abonka@uab.edu)  
Presenting author fax:

Date:

Prefer Oral

Session: Nesting Biology

## TIMING OF NEST EMERGENCE IN KEMP'S RIDLEY AND LEATHERBACK HATCHLINGS

Amy N. Bonka<sup>1</sup>, Thane Wibbels<sup>1</sup>, Ricardo F. Tapilatu<sup>2,3</sup>, William G. Iwanggin<sup>2</sup>, Hengki Wona<sup>2</sup>, Yairus Swabra<sup>2</sup>, Sadrak Woisiri<sup>2</sup>, Riki Mayor<sup>2</sup>, Gideon Waroy<sup>2</sup>, Erick Sembor<sup>2</sup>, Roy Rumbiak<sup>2</sup>, Blanca Zapata Najera<sup>4</sup>, Laura Sarti Martinez<sup>5</sup>, Erika Navarro Ang<sup>6</sup>, Manual Rosas<sup>6</sup>, Gerardo Marin<sup>6</sup>, Francisco Illescas<sup>7</sup>, L. Jaime Pena<sup>6</sup>, Patrick Burchfield<sup>6</sup>

<sup>1</sup>Biology Department, University of Alabama at Birmingham (UAB), USA

<sup>2</sup>Bird's Head Leatherback Conservation Program – Research Center for Pacific Marine Resources, University of Papua (UNIPA), Manokwari, Papua Barat, Indonesia

<sup>3</sup>Marine Science Department – Faculty of Fisheries and Marine Science, University of Papua (UNIPA), Manokwari, Papua Barat, Indonesia

<sup>4</sup>Comision Nacional de Areas Naturales Protegidas, Ciudad Victoria, Tamaulipas, Mexico

<sup>5</sup>Comision Nacional de Areas Naturales Protegidas, Ciudad de Mexico, Mexico

<sup>6</sup>Gladys Porter Zoo, Brownsville, TX, USA

<sup>7</sup>Conservacion de Espacios Naturales – Sociedad Civil, Tamaulipas, Mexico

### Abstract

Emergence from the nest represents a pivotal life history event which potentially enhances survival (e.g. through the avoidance of predators and heat-induced mortality). We have been using infrared wildlife cameras to evaluate emergence times in two different species: the Kemp's ridley sea turtle at Rancho Nuevo, Mexico, and the leatherback sea turtle at Bird's Head, Papua Barat, Indonesia. Our preliminary results from Bird's Head suggests a relatively early emergence time from approximately 6pm – 1am. In contrast, our results from the Kemp's ridley suggest the majority of hatchlings emerge between midnight and 8am. Temperature was evaluated as a potential cue controlling the timing of emergence. The results indicate that emergence in the Kemp's ridleys occurred at a time period during which nest temperatures are decreasing, which coincides with nighttime hours. This could potentially minimize predation from beach and near-shore predators, as well as reduce the risk of mortality due to desiccation. The apparent difference between emergence times of the two species examined in the current study suggests there may be species and/or nesting beach specific factors that affect emergence time, to potentially enhance the survival of hatchlings.

# Timing of Nest Emergence in Kemp's Ridley and Leatherback Hatchlings



Amy N. Bonka<sup>1</sup>, Thane Wibbelis<sup>1</sup>, Ricardo F. Tapilatu<sup>2,3</sup>, William G. Iwangein<sup>2</sup>, Henry Wona<sup>2</sup>, Yairus Swabra<sup>2</sup>, Zadrak Woisir<sup>4</sup>, Riki Mayor<sup>2</sup>, Gideon Waroy<sup>2</sup>, Erick Sembor<sup>2</sup>, Roy Rumbiak<sup>2</sup>, Bianca Zapata Najera<sup>4</sup>, Laura Sarti Martinez<sup>5</sup>, Erika Navarro Ang<sup>6</sup>, Manual Rosas<sup>6</sup>, Gerardo Marin<sup>6</sup>, Francisco Illescas<sup>7</sup>, L. Jaime Peña<sup>6</sup>, Pat Burchfield<sup>6</sup>

<sup>1</sup>Department of Biology, University of Alabama at Birmingham, USA, <sup>2</sup>Bird's Head Leatherback Conservation Program – Research Center for Pacific Marine Resources, University of Papua, Indonesia, <sup>3</sup>Marine Science Department, University of Papua, Indonesia, <sup>4</sup>Comision Nacional de Areas Naturales Protegidas, Ciudad Victoria, Mexico, <sup>5</sup>Comision Nacional de Areas Naturales Protegidas, Ciudad de Mexico, Mexico, <sup>6</sup>Gladys Porter Zoo, Brownsville, TX, <sup>7</sup>Conservacion de Espacios Naturales – Sociedad Civil, Tamaulipas, Mexico



## INTRODUCTION

- The Kemp's ridley (Figure 1) and the western Pacific leatherback (Figure 2) are critically endangered species<sup>1</sup>.
- The majority of Kemp's ridley nesting occurs along the coast of the Mexican state of Tamaulipas, primarily at Rancho Nuevo (Figure 3), with small numbers nesting along the coasts of Texas and Veracruz<sup>2</sup>.
- The last stronghold of nesting for the western Pacific leatherback is at the Bird's Head beaches (Jamuksa Medid and Wermom), Papua Barat, Indonesia (Figure 4)<sup>3</sup>.
- In other sea turtle species, hatchlings have been noted to emerge from their nests in group emergence events and make their way to the ocean under the cover of darkness. The Kemp's ridley has been anecdotally reported to emerge in the early morning hours as well as after sunrise. However, emergence events and behavior have not been evaluated in the Kemp's ridley<sup>4,5</sup>.
- Emergence from the nest represents a pivotal life history event which potentially enhances survival (e.g. through the avoidance of predators and heat-induced mortality).
- Knowledge of this behavior is crucial to the development of optimal conservation policies.

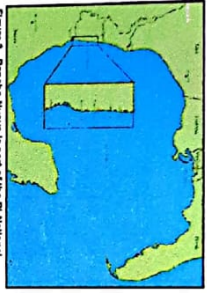


Figure 3. Rancho Nuevo is part of the Bi-national Kemp's ridley recovery program which covers an area of just over 200 km along the coast of Tamaulipas, Mexico. A red box indicates the northernmost camp in the program. Rancho Nuevo is indicated by the red dot.

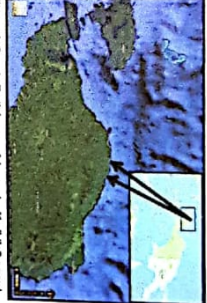
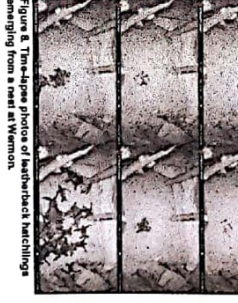
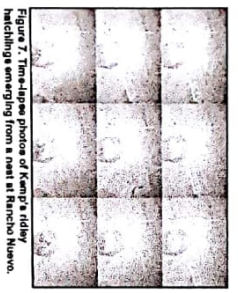


Figure 4. Google Earth image of Jamuksa Medid (left arrow) and Wermom (right arrow) beaches. Inset shows the Bird's Head Peninsula.



## MATERIALS AND METHODS

- Data loggers were placed in the middle of the egg mass at the start of the incubation period.
- Nests containing temperature data loggers were chosen to have the emergence events monitored.
- Infrared, time-lapse wildlife cameras were mounted above nests on nights of expected emergence (Figures 5, 6).
- Cameras were set to capture photos every 10 seconds at Rancho Nuevo and every 10 minutes at Jamuksa Medid and Wermom.
- Cameras were placed from approximately 10pm-5am at Rancho Nuevo and from approximately 6pm-5am at Jamuksa Medid and Wermom. This process was repeated on various nights throughout the 2014 nesting season at Rancho Nuevo, 2016 hatching season at Jamuksa Medid, and 2017 hatching season at Wermom.



Figure 6. Camera setup at Rancho Nuevo, Mexico. Each turtle-covered crevice is a nest.

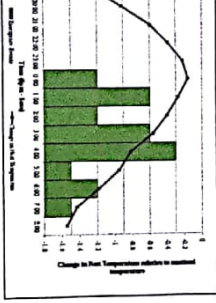


Figure 10. Emergence events and change in nest temperature relative to maximal temperature of nests from Rancho Nuevo.

## FUTURE DIRECTIONS

- Continue this project during the 2017 nesting seasons and increase sample sizes of the Kemp's ridley at Rancho Nuevo and of the leatherback at Jamuksa Medid and Wermom beaches.
- Comparison of egg hatcher and *in situ* nests for both the Kemp's ridley and the leatherback.
- Investigating the timing of hatching from the egg in relation to the timing of emergence from the nest.
- Further investigation into the relationship between nest temperature and emergence through additional data logger placement (multiple temperature locations within the nest).

## RESULTS

- The majority of monitored Kemp's ridley nests at Rancho Nuevo emerged between midnight and dawn (n = 21).
- The leatherback nests monitored at Jamuksa Medid emerged between 7:00pm and 1:00am (n = 7).
- The leatherback nests monitored at Wermom emerged between 7:00pm and 11:00pm (n = 2).
- At Rancho Nuevo, nests emerged when temperatures within in the nest were at the peak or just after the peak in the daily temperature cycle.
- Temperature data from nests at Jamuksa Medid and Wermom are still being analyzed, but preliminary results suggest these nests may follow a similar trend as those at Rancho Nuevo.

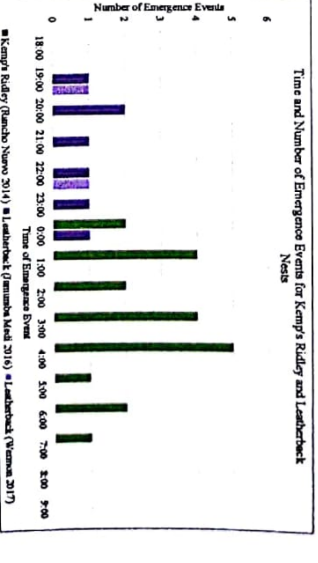


Figure 8. Time and Number of Emergence Events for Kemp's Ridley and Leatherback Nests.

## CONCLUSIONS

- The apparent difference between emergence times of the two species examined in the current study suggests emergence times may be species and/or population specific.
- Further, the results of the current study suggest there may be species and/or nesting beach specific factors that affect emergence time, to potentially enhance the survival of hatchlings.
- At Rancho Nuevo, nests emerged when temperatures within in the nest were at the peak or just after the peak in the daily temperature cycle.
- These results suggest hatchlings may use the consistent temperature cues of the nest as a cue during emergence, however further investigation is needed into the relationship between nest temperature and emergence.
- Conservation considerations:
  - Use of egg hatcher limits the thermal environment of the nest.
  - However, egg hatcher would otherwise be utilized for nesting (part of the natural nesting beach) so they still undergo natural daily fluctuations in temperature.
- For programs that move nests to protected egg hatcheries, it may be advisable to release hatchlings as close to natural emergence times as possible to mimic the natural behavior which may have evolved to maximize survival.

## ACKNOWLEDGEMENTS

We would like to thank everyone whose support and contributions made this multi-national project possible including financial support from the Biology Department of the University of Alabama at Birmingham, Gladys Porter Zoo, Comision Nacional de Areas Naturales Protegidas (CONANP), CIBIC, University of Papua (UNIPA), Research Center for Pacific Marine Resources (CONPAP), National Geographic Foundation, and the field crews of Rancho Nuevo, Jamuksa Medid and Wermom.

<sup>1</sup>U.S. Fish and Wildlife Service (2010). *Endangered and Threatened Species of the United States: 2009-2010*. Washington, DC: U.S. Fish and Wildlife Service. <sup>2</sup>U.S. Fish and Wildlife Service (2010). *Endangered and Threatened Species of the United States: 2009-2010*. Washington, DC: U.S. Fish and Wildlife Service. <sup>3</sup>U.S. Fish and Wildlife Service (2010). *Endangered and Threatened Species of the United States: 2009-2010*. Washington, DC: U.S. Fish and Wildlife Service. <sup>4</sup>U.S. Fish and Wildlife Service (2010). *Endangered and Threatened Species of the United States: 2009-2010*. Washington, DC: U.S. Fish and Wildlife Service. <sup>5</sup>U.S. Fish and Wildlife Service (2010). *Endangered and Threatened Species of the United States: 2009-2010*. Washington, DC: U.S. Fish and Wildlife Service.