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NOTE

ADDITIONAL FIELD RECORDS PROVIDE FURTHER RESOLUTION OF THE DISTRIBUTION OF THE WATER MONITOR *VARANUS SALVATOR* (SQUAMATA: VARANIDAE) IN NORTHWESTERN MYANMAR

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ADDITIONAL FIELD RECORDS PROVIDE FURTHER RESOLUTION OF THE DISTRIBUTION OF THE WATER MONITOR *VARANUS SALVATOR* (SQUAMATA: VARANIDAE) IN NORTHWESTERN MYANMAR

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Despite being one of the most common and widely distributed varanids in South and Southeast Asia (Bennett et al. 2010; Das 2010; Chan-ard et al. 2015), the distribution of the Water Monitor *Varanus salvator* (Laurenti, 1768) within Myanmar remains poorly delineated, particularly for the central and northern regions of the country (Cota et al. 2009; Sai Sein Lin Oo & Bates 2016). Smith (1935) stated that *V. salvator* was “plentiful throughout Burma” [now Myanmar] without mentioning any specific localities. Anderson (1878) and Boulenger (1888) reported specimens of *V. salvator* from the Bhamo and the Kachin Hills, respectively. Cota et

al. (2009) suggested these earlier records could be in error, perhaps representing specimens obtained in markets or transported as food, and further noted that extensive collecting by research teams from the California Academy of Sciences failed to record *V. salvator* anywhere in central and northern Myanmar. More recently, Oo & Bates (2016) confirmed the occurrence of *V. salvator* in north-central Myanmar after photographing a large adult in Bhamo and finding a locally-collected specimen being offered for sale at a market in Banmawk, about 140km west of Bhamo (Fig. 1). Sai Sein Lin Oo & Bates (2016) concluded these records either (1) represent an isolated and perhaps relict occurrence or (2) the distribution of *V. salvator* extends up the Ayeyarwady River and its tributaries.

We herein present two additional photo records, which further document the distribution of *V. salvator* within northwestern Myanmar (Fig. 1). The first record was obtained on 26 April 2016 when one of us (MMW) photographed a juvenile (total length [TL] ca. 90–100 cm) *V. salvator* while traveling by boat along Nam Pi Lin Stream (25.683°N & 95.636°E; elevation ca. 100m) in Sagaing Region (Image 1). The monitor was basking on a log extending from a steep bank and over-hanging the stream, and dropped into the water as the boat

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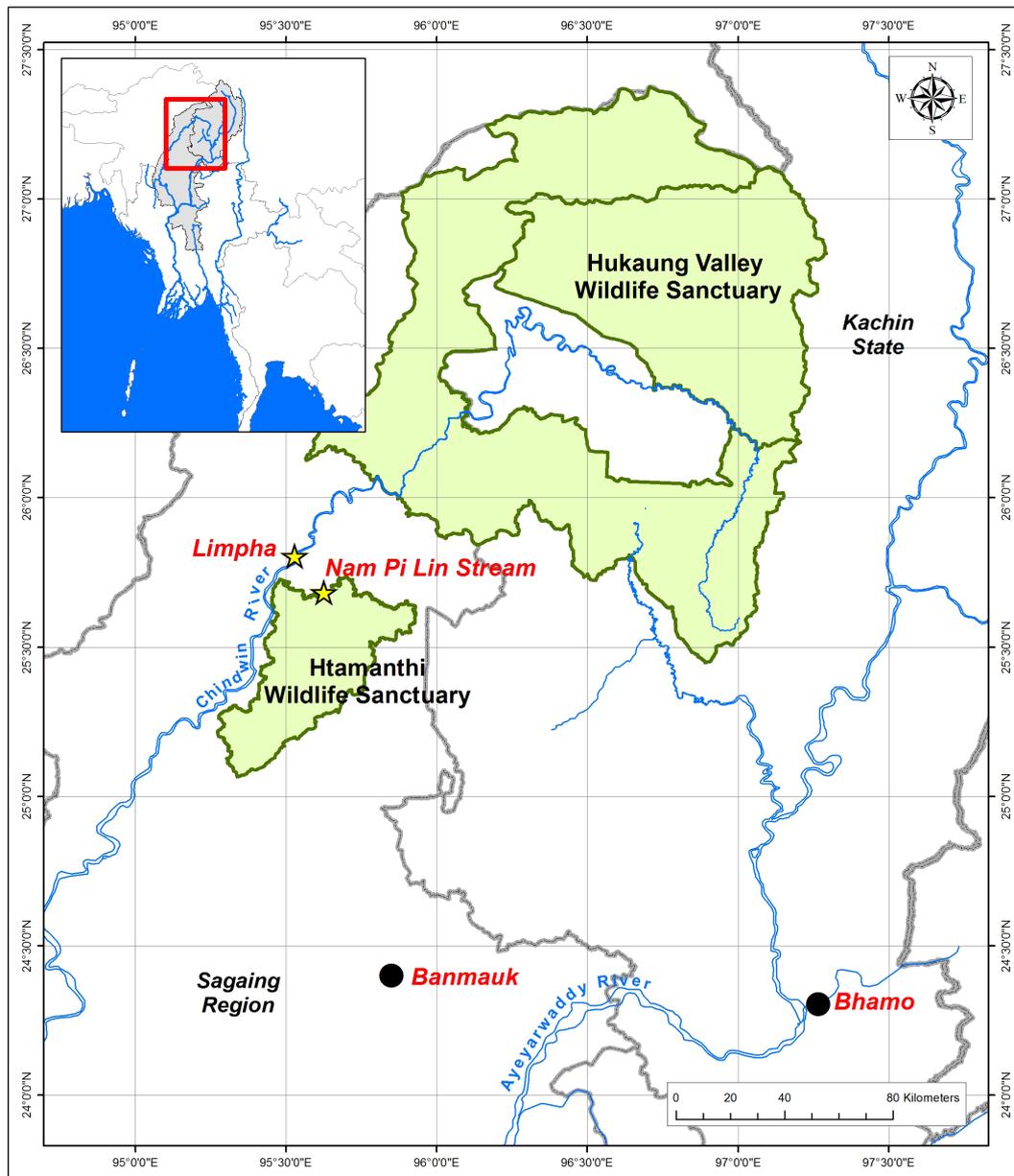


Figure 1. Map showing confirmed locality records for Water Monitors *Varanus salvator* in northern Myanmar: yellow stars (our study) and dark circles (Sai Sein Lin Oo & Bates 2016). Inset shows the area of interest within Myanmar.

approached. Nam Pi Lin Stream is encompassed within the boundaries of Htamanthi Wildlife Sanctuary. The habitat along this section of the stream is dense riparian forest and bamboo thickets transitioning into old-growth evergreen forest with increasing elevation away from the water. Additional information on the vegetation and physiography of Htamanthi Wildlife Sanctuary is provided by Beffasti & Galanti (2011).

The second photo record was obtained when a large adult *V. salvator* (TL ca. 150cm) was “captured” on a game camera deployed about 0.25km south-east

of Limpha Village (25.808°N & 95.536°E; elevation ca. 132m) in Sagaing Region. The game camera (Moultrie Series A) was set in a densely vegetated seasonal swamp along the Chindwin River beside the carcass of a young domestic Water Buffalo *Bubalus bubalis* (Linnaeus, 1758) that had perished after becoming mired in deep mud. The motion-sensitive game camera (programed to take three photographs at 1-min intervals) was deployed from 17 February to 6 March 2018 (17 trap-nights) and captured a sequence of six images (1324–1326 hr) of a Water Monitor on 1 March (Images 2A–F). The first



Image 2. Juvenile Water Monitor basking on a limb over-hanging Nam Pi Lin Stream in Htamanthi Wildlife Sanctuary, Sagaing Region, Myanmar

image shows the monitor with head and neck extended back and upwards in a near-vertical position usually exhibited when swallowing (Image 2A). The monitor then investigates the remains of the carcass (Image 2B–C) and moves across and away from the camera (Image 2D–F). At the time these photographs were taken the buffalo carcass consisted of little more than bones in a pool of fetid muck (Stage 6 of Payne 1965).

Our photo records from Nam Pi Lin Stream and Limpha Village extend the known distribution of *V. salvator* in Myanmar approximately 170km north and westwards of the recent records from Bhamo and Banmauk (Oo & Bates 2016). Collectively, these records strongly suggest the distribution of *V. salvator* extends up the Ayeyarwady and Chindwin Rivers into northern and northwestern Myanmar. We see no reason to assume these records represent an isolated relict occurrence of *V. salvator* in northern Myanmar as suggested by Sai Sein Lin Oo & Bates (2016). Given the lack of apparent geographic barriers to dispersal, we further suggest the distribution of *V. salvator* extends at least as far north as the Hukaung Valley in Kachin State. Obviously additional investigation will be required to resolve these biogeographical questions.

Our photo records of *V. salvator* appear to be assignable to the subspecies *V. salvator macromaculatus* Deraniyagala 1944, which until recently was thought to be restricted to Thailand (Koch et al. 2007; Cota et al. 2009; Sai Sein Lin Oo & Bates 2016). Although considerable inter-population variation is evident in

V. salvator macromaculatus (Cota et al. 2009), the two individuals in our photo records exhibit attributes consistent with this subspecies, namely, 1) brownish dorsal background color with at least five transverse rows of ocelli and light dotting between rows, 2) light chin with prominent crossbands on snout, 3) light ventral surface with six dark, sharply pointed bars on lateral surface, and 4) anterior tail with transverse rows of light spots and ocelli, and posterior tail with distinctive alternating light and dark crossbands (Koch et al. 2007). Similarly, Sai Sein Lin Oo & Bates (2016) concluded the two specimens they examined in northern Myanmar were assignable to *V. salvator macromaculatus*. Finally, our experience highlights the potential for using automated game cameras for documenting the occurrence and behaviors of varanids (see also Ariefiandy et al. 2013; Bennett & Clements 2014).

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Image 2. Series of six images from a game camera showing an adult Water Monitor at the badly decomposed remains of a young Water Buffalo in a swamp near Limpha Village, Sagaing Region, Myanmar. Monitor with head tilted back and upwards (right arrow) with left arrow denoting location of buffalo remains in deep mud (A). Monitor investigates remains (B-C) and then moves across and away from camera (D-F).

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