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DIVERSITY OF SEA SNAKES ALONG THE SAURASHTRA COAST, GUJARAT, INDIA

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ABSTRACT:

The present study reports the diversity of sea snakes along the Saurashtra coast. Seven species of sea snakes belonging to sub-family *Hydrophiinae* and three from family *Acrochordidae* and *Colubridae* were reported. The detailed taxonomic identification of reported species with synonyms, diagnostic characters and distribution is given here.

KEY WORDS: *Sea snakes, Diversity, Taxonomy, Gulf of Khambhat, Saurashtra Cost.*

INTRODUCTION:

Sea snakes are marine reptiles with oar like tail, which are found in tropical and sub-tropical waters (Tu, 1988). With two sub families *Hydrophiinae* and *laticaudinae* sea snakes classifies under the Family Elapidae. Among this *Hydrophiinae* represents true sea snakes with laterally compressed tail and enlarged head shield. All have valvular nostril on top of the snout (Gow, 1977). While the sub family *laticaudinae* represent amphibious forms which forage at the sea but return to mate on land (Shetty and Shine, 2002). *Laticaudinae* has well-developed ventrals compare to the *Hydrophiinae* and laying egg on the land.

Sea snakes comprise about 86% of the living marine reptile species. Among 15 families of snakes, 04 are marine, of them *Hydrophiinae* comprises 12 genera with 52 species (Venkatraman, 2015). A total of 60 species were

reported from the seas of the world (Murthy, 1999). Amongst 29 species have been reported from Indian Ocean, including coast of Pakistan, Bangladesh, Shri Lanka and Myanmar (Smith, 1943, Ahmed, 1975). Many authors have worked on diversity and taxonomy of sea snakes of Indian Ocean like 20 species of sea snakes were reported from the Indian Coast (Murthy, 1992 and Whitaker, 2004), Lobo *et al.*(2004) studied the morphometric relationship of marine snake along the Goa coast, 14 species were reported from the Pakistan Coast (Khan, 2016). Vyas (2000) has reviewed the reptile studies from Gujarat and reported occurrence of 10 species of Sea snakes from entire Gujarat Coast. Present study includes distribution as well as detailed taxonomical description of the sea snakes of the entire Saurashtra coast of Gujarat, India.

STUDY AREA:

Gujarat state situated at the extreme west of India. The State has India's longest coastline of around 1,650 km and enjoys the status of having two out of the three gulfs of India, those of the Gulf of Kutch and Gulf of Khambhat. Saurashtra coastline is southwestern edge of Gujarat (India) which occupies about 865 km long coastline.

MATERIAL AND METHODS:

The study was carried out during June 2013 to December 2015. In the Gulf of Khambhat, stake nets were used for the capturing of Bombay duck, Mudskipper, crab, prawns etc. in the intertidal areas. Sea snakes were obtained as by-catch from stationary stake nets managed by local fisher folk on Bhavnagar coastline. Beside this, fish landing centres of Saurashtra coasts were also visited for the study as during fishing operation sea snakes were caught incidentally and brought to the coast/landing centre by the fishermen.

The key characters like scale pattern, number of ventral's, head to tail length, total length etc. were recorded properly on field, photographed properly and release back in the field. As the sea snakes are protected under Wild Life Protection Act, 1972, collection was avoided. Snakes were identified with the help of the taxonomic key characters given by Smith, 1926, Dowling 1951, Murthy 1977, 1986, and 1992, Warrel, 1994 Lneich, 1996, Rasmussen, 1993, 1997 and Khan, 2016.

RESULT AND DISCUSSION:

The marine snakes of Saurashtra coast represents from 3 families, i.e., *Acrochordidae*, *Homalopsidae* and *Elapidae* (*Hydrophiinae*). Sea snake were common in mangrove and mud flat areas compare to rocky intertidal area as it may possess high numbers of gobiidae in an around the area. The distribution of *Hydrophis mamillaris* was restricted to the Bhavnagar Coastline while other members of *Hydrophiinae* were almost common in entire Saurashtra region except *H. curtus* and *H. ornatus*. Stranding of *Hydrophis platurus*, *H. curtus*, *H. schistosus* was very common during the sever wave

action. Beside these three estuarine snake species from two family were also reported from the study area. The stranding of *Gerarda prevostiana* was very common during the monsoon season.

1. *Hydrophis cyanocinctus* DAUDIN, 1803 (Fig.2-A)

Common name: - Annulated sea snake

Synonymy: *Hydrophis cyanocinctus* DAUDIN 1803, *Leioselasma striata* LACÉPÈDE 1804, *Hydrophis chittal* RAFINESQUE 1817, *Hydrophis striata* SCHLEGEL 1837, *Hydrophis subannulata* GRAY 1849, *Hydrophis aspera* GRAY 1849? *Hydrophis striatus* DUMÉRIL & BIBRON 1854, *Hydrophis striata* FISCHER 1856, *Hydrophis westermanni* JAN 1859, *Hydrophis westermanni* JAN 1863, *Hydrophis trachyceps* THEOBALD 1868, *Hydrophis crassicollis* ANDERSON 1871, *Hydrophis tuberculatus* ANDERSON 1871 (by SMITH 1920), *Hydrophis tenuicollis* PETERS 1873, *Hydrophis taprobanica* HALY 1887, *Hydrophis phipsoni* MURRAY 1887, *Hydrophis cyanocincta* BOULENGER 1887, *Distira cyanocincta* WERNER 1895, *Distira cyanocincta* BOULENGER 1896, *Distira sabavacensis* BOULENGER 1900 (fide KHARIN 2008), *Disteira cyanocincta* STEJNEGER 1907, *Leioselasma* [sic] *cyanocincta* WALL 1921, *Hydrophis cyanocinctus* SMITH 1943, *Leioselasma cyanocincta* PRATER 1924, *Leioselasma cyanocinctus* KHARIN 1984, *Leioselasma cyanocincta* WELCH 1994, *Leioselasma cyanocinctus* DAS 1996, *Hydrophis cyanocinctus* MURPHY, COX & VORIS 1999, *Leioselasma cyanocincta* KHARIN 2005, *Leioselasma cyanocincta* KHARIN 2008, *Hydrophis cyanocinctus* MAHONY *et al.* 2009, *Hydrophis cyanocinctus* SANG *et al.* 2009, *Hydrophis cyanocinctus* MURTHY 2010, *Hydrophis cyanocincta* RASMUSSEN *et al.* 2011, *Hydrophis cyanocinctus* SANDERS *et al.* 2012, *Leioselasma cyanocincta* WALLACH *et al.* 2014, *Leioselasma cyanocinctus* CHAN-ARD *et al.* 2015, *Hydrophis cyanocinctus* REZAIIE-ATAGHOLIPOUR *et al.* 2016.

Pholidosis: Neck scale 30-33. Mid body scale 37-40. One pre ocular and two post ocular. Supra labial 07-08, 3rd to 5th touch the eyes. Infra labial 9-10. **Other diagnostic characters:** Maxillary teeth 06-07. Ventral scale 348-358. Dorsally dirty white or pale green or yellow with 58-74 bluish or black cross bands on entire body. **Size:** - Total length - 945 mm to 342 mm. **Distribution:**-From Arabian Gulf in the west to Japan in the east (David & Ineich, 1999). Presently distributed throughout Gujarat coast.

2. *Hydrophis mamillaris* DAUDIN, 1803 (Fig.2-B)

Common name: - Bombay sea snake

Synonymy: *Anguis mamillaris* DAUDIN 1803, *Leioselasma mamillaris* SMITH 1926, *Lioselasma* [sic] *mamillaris* WALL 1921, *Hydrophis mamillaris* SMITH 1943, *Aturia mamillaris* WELCH 1994, *Hydrophis mamillaris* DAS 1996, *Hydrophis mammillaris* [sic] KHAN 2002 (pers. comm.), *Chitulia mamillaris* KHARIN 2005, *Chitulia mamillaris* KHARIN & DOTSENKO 2012, *Hydrophis mamillaris* SANDERS *et al.* 2012 (by implication), *Chitulia* (*Dolichodira*) *mamillaris* KHARIN 2012, *Chitulia mamillaris* WALLACH *et al.* 2014.

Pholidosis: Neck scale 29-36, mid body scale 38-42, Supra labial 07, 3rd and 4th touches the eye. 7-8 infra labial. One pre ocular and two post ocular. **Other diagnostic Characters:** - Maxillary teeth 5-6, Ventral scale 249-350, Scales sub-quadrangular or hexagonal in shape. **Colouration:**-Head entirely black with yellow streak on temporal region. Yellowish or greyish 52-59 broad black bands on the body. **Size:** - Total length - 570-760 mm. **Distribution:** - It is known to occur along both coasts of the Indian subcontinent: East and West coast (Smith 1943). It is restricted to Bhavnagar coast, Gulf of Khambhat with dense population.

3. *Hydrophis schistosus* DAUDIN, 1803 (Fig.2-C)

Common names: - Common or beaked sea snake, Hook-nosed sea snake

Synonymy: *Hydrophis schistosus* DAUDIN 1803, *Hydrus valakadyen* BOIE 1827, *Disteira russelii* FITZINGER 1827 (based on RUSSELL 1801), *Polyodontes annulatus* LESSON 1831, *Hydrophis schistosa* SCHLEGEL 1837 (not of DAUDIN 1803), *Hydrophis subfasciata* GRAY 1842, *Hydrophis bengalensis* GRAY 1842, *Enhydrina valakadyen* GRAY 1849 (emendation), *Thalassophis wernerii* SCHMIDT 1852, *Hydrophis schistosus* DUMÉRIL & BIBRON 1854, *Hydrophis schistose* FISCHER 1856, *Enhydrina schistosa* STOLICZKA 1870, *Enhydrina valakadyen* STOLICZKA 1870, *Hydrophis fasciatus* JAN 1872 (not of SCHNEIDER), *Hydrophis schistosus* JAN 1872, *Enhydrina valakadien* BOULENGER 1890 (emendation), *Enhydrina vikadien* BOETTGER 1892 (in error), *Enhydrina schistosa* VAN DENBURGH 1895, *Enhydrina valakadien* BOULENGER 1896, *Enhydrina velakadien* FLOWER 1899 (in error), *Enhydrina valakadyen* STEJNEGER 1907, *Enhydrina valakadien* GADOW 1909, *Enhydrina valakadyen* WALL 1921, *Enhydrina schistose* SMITH 1943, *Disteira schistosa* MCDOWELL 1972, *Disteira schistosa* GRANDISON 1978, *Enhydrina schistosa* GLAW & VENCES 1994, *Disteira schistosa* RASMUSSEN 1997, *Enhydrina schistosa* COX *et al.* 1998, *Enhydrina schistosa* MURPHY, COX & VORIS 1999, *Enhydrina schistosa* COGGER 2000, *Enhydrina schistose* WILSON & SWAN 2010, *Enhydrina schistosa* RASMUSSEN *et al.* 2011, *Hydrophis schistosus* SANDERS *et al.* 2012 [by implication], *Enhydrina schistosa* WALLACH *et al.* 2014, *Enhydrina schistosus* CHAN-ARD *et al.* 2015, *Hydrophis schistosus* REZAIIE-ATAGHOLIPOUR *et al.* 2016

Pholidosis: Neck Scale 41-45, 59-63 scale row around thickest part of body. Supra labial 8 in number, 3rd or 4th, 4th or 5th touches the eyes. One pre ocular and two post ocular. 7-8 infra labial, last one was minuscule. **Other diagnostic Characters:** Mental conceal behind the chin shield. Small mental protrude downward, giving appearance of beak like structure. Head entirely granulated. Maxillary teeth 05-06. Ventral scale 341-358, small elongated to hexagonal costals with centrally keeled increase in size towards mid body. **Coloration:** - Body grey or bluish grey dorsally, whitish grey ventrally, with dark or black bands on entire body. **Size:** - Total length – 350 mm to 1304 mm. **Distribution:**- Arabian Gulf, India, Sri Lanka, Indo-Malayan Archipelago, South China Sea, Indonesia and the Australia region

(David & Ineich, 1999). It is distributed throughout Gujarat coast. Encounter rate of neonates were common during monsoon in Gulf of Khambhat.

4. *Hydrophis platurus* LINNAEUS, 1766 (Fig.2-D)

Common names: - Yellow belly sea snake, Pelagic sea snake

Synonymy: *Anguis platara* LINNAEUS 1766, *Hydrus bicolor* SCHNEIDER 1799, *Pelamis bicolor* SCHNEIDER 1799, *Pelamis platurus* [sic] DAUDIN 1803, *Pelamis bicolor* DAUDIN 1803, *Pelamis schneideri* RAFINESQUE 1817(nom. subst.), *Hydrophis pelamis* SCHLEGEL 1837 (nom. subst.), *Pelamis ornata* GRAY 1842, *Pelamis bicolor* DUMÉRIL, BIBRON & DUMÉRIL 1854, *Pelamis bicolor* var. *variegata* DUMÉRIL, BIBRON & DUMÉRIL 1854, *Pelamis bicolor* var. *sinuata* DUMÉRIL, BIBRON & DUMÉRIL 1854, *Hydrophis (Pelamis) bicolor* Var. *alternans* FISCHER 1855, *Hydrophis (Pelamis) bicolor* Var. *sinuata* FISCHER 1855, *Hydrophis (Pelamis) bicolor* Var. *alternans* FISCHER 1856 (nom. subst. pro *P. variegata*), *Hydrophis (Pelamis) bicolor* FISCHER 1856, *Hydrophis (Pelamis) bicolor* Var. *sinuata* FISCHER 1856, *Hydrus platurus* BOULENGER 1896, *Hydrus platurus* STEJNEGER 1907, *Pelamydrus platurus* STEJNEGER 1910, *Pelamydrus platurus* KINGHORN 1928, *Pelamydrus platurus* MERTENS 1930, *Pelamis platurus* SMITH 1943, *Pelamis platurus* PETERS & OREJAS-MIRANDA 1970, *Pelamis platurus* STEBBINS 1985: 224, *Pelamis platurus* LINER 1994, *Pelamis platurus* GLAW & VENCES 1994, *Pelamis platurus* COX *et al.* 1998: 35, *Pelamis platurus* MURPHY, COX & VORIS 1999, *Pelamis platurus* COGGER 2000, *Pelamis platara* BÖHME 2003, *Pelamis platurus* LEVITON *et al.* 2003, *Pelamis platurus* SHARMA 2004, *Pelamis platyura* [sic] DAS & YAAKOB 2007, *Pelamis platurus* SANG *et al.* 2009, *Pelamis platurus* WILSON & SWAN 2010, *Pelamis platara* CROTHER *et al.* 2012, *Hydrophis platurus* SANDERS *et al.* 2012 [by implication], *Pelamis platara* WALLACH *et al.* 2014, *Pelamis platurus* COGGER 2014, *Pelamis platurus* CHANARD *et al.* 2015, *Hydrophis platurus* REZAIIE-ATAGHOLIPOUR *et al.* 2016.

Pholidosis: Neck scale 36-45, scale row around thickest part of body 46-52. Supra labial 08, 4th or 5th touches the eye. One pre ocular and two post ocular. Infra labial 10 last three was minuscule. Second supralabial in contact with prefrontal. **Other diagnostic Characters:** - Head elongated with slightly broader than neck. Ventral 264-302, body scale sub-quadrangular. Maxillary teeth 09-10. **Colouration:**

- Dorsum blueish black to brownish, yellowish below, the dorsal and ventral sharply demarcated from each other. Creamy white tail with small blueish black spots. **Size:** - Total length-450 mm to 642 mm.

Distribution:-The Indian Ocean and the Pacific Ocean (Ineich, 1988; David & Ineich, 1999; Kharin, 2007). It is distributed throughout Gujarat coast.

5. *Hydrophis curtus* SHAW, 1802 (Fig.2-E)

Common names: - Shaw's sea snake, Short sea snake, Hardwicke's sea snake, Spine-bellied sea snake.

Synonymy: *Hydrus Curtus* SHAW 1802, *Hydrophis pelamidoides* SCHLEGEL 1837, *Lapemis curtus* GRAY 1842, *Lapemis loreatus* GRAY 1843, *Hydrophis pelamidoides* DUMÉRIL & BIBRON 1854,

Hydrophis (Pelamis) pelamidoides var. *annulata* FISCHER 1855, *Hydrophis (Pelamis) pelamidoides* FISCHER 1856, *Hydrophis (Pelamis) pelamidoides* var. *annulata* FISCHER 1856, *Hydrophis propinquus* JAN 1859, *Hydrophis abbreviatus* JAN 1863, *Hydrophis brevis* JAN 1863, *Hydrophis fayreriana* ANDERSON 1871, *Hydrophis pelamoides* HILGENDORF 1876 (in error), *Hydrophis hardwickei* BOETTGER 1888 (emendation), *Enhydris curtus* WERNER 1895, *Enhydris curtus* BOULENGER 1896, *Lapemis curtus* RASMUSSEN 1997, *Lapemis curtus* MURPHY, COX & VORIS 1999, *Lapemis curtus* WILSON & SWAN 2010, *Lapemis curtus* RASMUSSEN *et al.* 2011, *Hydrophis curtus* SANDERS *et al.* 2012 [by implication], *Lapemis curtus* WALLACH *et al.* 2014, *Lapemis curtus* COGGER 2014, *Lapemis curtus* CHAN-ARD *et al.* 2015.

Pholidosis: Scale around neck 25-33, Scale row around mid-body 32-39. 7-8 supralabial, 3rd and 4th in contact with eyes; one pre-ocular, 2 post-ocular. **Other diagnostic Characters:** - Parietal broken into small scales. Ventral 146-185, Scale somewhat squarish or hexagonal in shape. Maxillary teeth 04-06.

Coloration: - Dorsum pale olive or yellow, Black or dark olive cross bars on entire body, tail black.

Size: Total length - 675 mm to 835 mm. **Distribution:** - Reported from the Persian Gulf, along the Makran and Karachi coasts, Peninsular India, Shri Lanka to Madras, Arabian Gulf of Japan, Philippines, Indonesia and Australian region (Davin & Ineich, 1999; Rasmussen & Ineich, 2000). It is distributed throughout Gujarat coast, more common on fringe of Arabian Sea.

6. *Hydrophis caerulescens* SHAW, 1802 (Fig.2-F)

Common Name: - Dwarf sea snake

Synonymy: *Hydrus Caerulescens* SHAW 1802, *Hydrophis caerulescens* GRAY 1842, *Hydrophis hybrida* SCHLEGEL 1844, *Hydrophis hybrida* FISCHER 1856, *Hydrophis protervus* JAN 1859, *Hydrophis frontalis* JAN 1863, *Hydrophis polydonta* JAN 1863, *Hydrophis caerulescens thai* SMITH 1920, *Polyodontognathus caerulescens* WALL 1921, *Hydrophis caerulescens* SMITH 1943, *Aturia caerulescens* WELCH 1994, *Hydrophis caerulescens* MURPHY, COX & VORIS 1999, *Hydrophis caerulescens* COGGER 2000, *Polyodontognathus caerulescens* KHARIN 2004, *Hydrophis caerulescens* DAVID *et al.* 2004, *Hydrophis caerulescens* SANG *et al.* 2009, *Hydrophis caerulescens* RASMUSSEN *et al.* 2011, *Hydrophis caerulescens* SANDERS *et al.* 2012, *Polyodontognathus caerulescens* WALLACH *et al.* 2014, *Polyodontognathus caerulescens* CHAN-ARD *et al.* 2015, *Hydrophis caerulescens hybridus* SCHLEGEL 1844, *Hydrophis hybrida* SCHLEGEL 1844, *Polyodontognathus caerulescens hybridus* KHARIN 2005, *Polyodontognathus caerulescens hybridus* KHARIN 2016.

Pholidosis: Scale around the neck 27-29, Scale around the mid body 36-42. 07-08 supra labial, 3rd & 4th in contact with eyes 5th in contact with post ocular. 08-09 Infra-labial. One pre-ocular and one post-ocular. **Other diagnostic Characters:** - Maxillary teeth 11. Ventral scales 256 to 315, larger than adjacent body scale, Body scale centrally keeled. **Coloration:** - Colour black or dark gray with

yellowish markings around eyes. 56-61 broad bluish-black or grey bands on entire body. These bands are broader than interspace between them. **Size:** Total length- 528 mm to 283 mm. **Distribution:-** India, Pakistan (Karachi Coast), Andaman Sea, Indo-Malayan Archipelago, South China Sea, Indonesia, Arafura Sea and Gulf of Carpentaria (Australia) (Minton, 1966, David & Ineich, 1999). It is distributed throughout Gujarat coast.

7. *Hydrophis ornatus* (GRAY, 1842) (Fig.2-G)

Common Name: - Ornate Reef sea snake

Aturia ornata GRAY 1842: 61, *Hydrophis laevis* LÜTKEN 1863, *Hydrophis ellioti* GÜNTHER 1864, *Hydrophis ornata* GÜNTHER 1864, *Hydrophis Elliotti* BOULENGER 1887: 408, *Distira andamanica* ANNANDALE 1905, *Distira mjobergi* LÖNNBERG & ANDERSSON 1913, *Hydrophis lamberti* SMITH 1917, *Disteira ornata* TAYLOR 1922, *Hydrophis inornatus* SMITH 1926, *Hydrophis ornatus* SMITH 1943, *Hydrophis ornatus* TAMIYA et al. 1983, *Aturia ornata* WELCH 1994: 25, *Hydrophis ornatus* MURPHY, COX & VORIS 1999, *Hydrophis ornatus* COGGER 2000: 718, *Chitulia ornata* KHARIN 2005, *Hydrophis ornatus* NGUYEN et al. 2009, *Hydrophis ornatus* WILSON & SWAN 2010: 530, *Hydrophis ornata* RASMUSSEN et al. 2011, *Chitulia ornata* KHARIN & DOTSENKO 2012, *Hydrophis ornatus* SANDERS et al. 2012, *Chitulia ornata* WALLACH et al. 2014: 166, *Chitulia ornata* CHAN-ARD et al. 2015: 278, *Hydrophis ornatus godeffroyi* PETERS 1873, *Hydrophis godeffroyi* PETERS 1873, *Distira godeffroyi* BOULENGER 1896: 291, *Disteira godeffroyi* STEJNEGER 1907: 430, *Hydrophis ornatus godeffroyi* NGUYEN et al. 2009: 407, *Hydrophis ornatus maresinensis* MITTLEMAN 1947, *Hydrophis ornatus maresinensis* MITTLEMAN 1947, *Hydrophis ornatus maresinensis* GORIS & MAEDA 2004: 254, *Hydrophis ornatus maresianus* NGUYEN et al. 2009: 407 (in error), *Hydrophis ornatus ornatus* (GRAY 1842), *Aturia ornata* GRAY 1842, *Distira ornata* BOULENGER 1896, *Hydrophis ornatus ornatus* NGUYEN et al. 2009: 407

Pholidosis: Scale row on neck 30-33, scale row around thickest part of body 39-42. 7 supralabial, 3rd and 4th in contact with eye. One pre-ocular, two post-ocular. 11 infra-labial. Two anterior temporal.

Other diagnostic Characters: Body thick and robust 10-11 maxillary teeth, Body scale quadracular with tuberculated ventrally and centrally keeled dorsally. Ventral 142-164 about twice as large as adjacent scales with two double tuberculate.

Coloration: Body with 46-53 dark bars of olive to greenish on dorsum, ventrally creamy to yellowish in colour up five to six body scale. **Size:** Total length – 68 to 970 mm. **Distribution:** - Found in Australia, China, Indonesia, Iran, Japan, Malaysia, Myanmar, New Caledonia, New Guinea, Oman, Pakistan, Philippines, Solomon Islands, Sri Lanka, India, Taiwan, Thailand, UAE and Vietnam. It is found throughout the Gujarat coast, more common on fringe of Arabian Sea.

8. *Acrochordus granulatus* SCHNEIDER, 1799 (Fig.2-H)

Common Names: - Little file snake, Marine file snake, Wart snake

Synonymy: *Hydrus Granulatus* SCHNEIDER 1799, *Acrochordus fasciatus* SHAW 1802, *Pelamis granulatus* DAUDIN 1803, *Chersydrus [fasciatus]* CUVIER 1817, *Chersydrus granulatus* MERREM 1820, *Acrochordus fasciatus* RAFFLES 1822, *Hydrus granulatus* RAFFLES 1822, *Acrochordus granulatus* CANTOR 1847, *Chersydrus annulatus* GRAY 1849, *Chersydrus fasciatus* DUMÉRIL & BIBRON 1854, *Chersydrus fasciatus* JAN 1863, *Chersydrus granulatus* BOULENGER 1893, *Chersydrus granulatus* DE ROOIJ 1917, *Chersydrus granulatus* WALL 1921, *Chersydrus granulatus granulatus* LOVERIDGE 1938, *Acrochordus granulatus granulatus* HAAS 1950, *Chersydrus granulatus* GRUBER in GRZIMEK 1970, *Chersydrus granulatus* GRANDISON 1978, *Acrochordus granulatus* MANTHEY & GROSSMANN 1997, *Acrochordus granulatus* GAULKE 1999, *Acrochordus granulatus* MCDIARMID, CAMPBELL & TOURÉ 1999, *Chersydrus granulatus* SHARMA 2004, *Acrochordus granulatus* MURTHY 2010

Diagnostic Characters: - Head and body scales are very minute and hard to count, granular and very rough. Scale patterns exhibits 9-10 Scales on a line between eyes, Supralabial 10, about 106-120 scales around thickest body part. **Colouration:** - Body marked with 51-59 dark grey or off-white rings which usually incomplete the circle. **Size:** Total length - 550 mm 753 mm. **Distribution:** - This species is distributed from west coast to up to West Bengal as well as Andaman & Nicobar Islands from India. Commonly encountered in Gulf of Khambhat especially in mud-flats and mangroves.

9. *Cerberus rynchops* SCHNEIDER, 1799 (Fig.2-I)

Common names: - South Asian bockadam, New Guinea bockadam, Dog-faced water snake

Synonymy: *Hydrus rynchops* SCHNEIDER 1799, *Hydrus cinereus* SHAW 1802, *Coluber cerberus* DAUDIN 1803, *Python rhynchops* MERREM 1820, *Homalopsis cerberus* FITZINGER 1826, *Homalopsis molurus* H. BOIE 1826, *Homalopsis rhynchops* BOIE 1827, *Cerberus cerberus* CUVIER 1829, *Cerberus cinereus* CANTOR 1839, *Homalopsis rhynchops* (sic) CANTOR 1847, *Cerberus rhynchops* GÜNTHER 1864, *Cerberus rhynchops* ANDERSON 1871, *Hurria rynchops* STEJNEGER 1907, *Hurria rynchops* MERTENS 1930, *Cerberus rynchops* SMITH 1930, *Cerberus rynchops rynchops* LOVERIDGE 1948, *Cerberus rhynchops* [sic] BOULENGER 1894, *Cerberus rhynchops* WALL 1921, *Cerberus rynchops* SMITH 1943, *Cerberus rhynchops* HENDRICKSON 1966, *Cerberus rynchops* MANTHEY & GROSSMANN 1997, *Cerberus rynchops* COGGER 2000, *Cerberus rynchops* COX *et al.* 1998, *Cerberus rhynchops* MURTHY 2010, *Cerberus rynchops* MURPHY & VORIS 2014, *Cerberus rynchops* WALLACH *et al.* 2014.

Diagnostic Characters: - Scale pattern 24:22:18. Sub caudal 53 and paired. Ventral 142 and anal divided. Supralabial 08; last two horizontally divided. Frontal and parietal divided. **Colouration:** - Brownish dorsal surface marked with darker bands or blotches, belly white or plain dark. **Size:** - 810mm. **Distribution:** - In India this species is distributed in all coasts of mainland, also found in Andaman &

Nicobar Islands. It is distributed in river, estuaries and coastal waters of Gujarat coast. Often found in mudskipper hole.

10. *Gerarda prevostiana* EYDOUX & GERVAIS, 1837 (Fig.2-J)

Common Names: - Gerard's Water Snake, Cat-eyed water snake, Glossy marsh snake

Synonymy: *Coluber (Homalopsis) prevostianus* EYDOUX & GERVAIS 1837, *Gerarda bicolor* GRAY 1849 (fide SMITH 1943), *Campylodon Prevostianum* DUMÉRIL & BIBRON 1854, *Gerarda prevostiana* COPE 1862, *Heleophis flavescens* MÜLLER 1884 (fide SMITH 1943), *Helipophis flavescens* MÜLLER 1884 (fide MURPHY & VORIS 2014, in error), *Gerardia prevostiana* WALL 1905, *Gerardia prevostiana* WALL 1921, *Gerardia prevostiana* SMITH 1943, *Gerardia prevostianus* DAS 1996, *Gerarda prevostiana* MANTHEY & GROSSMANN 1997, *Gerarda prevostiana* COX *et al.* 1998, *Gerardia prevostiana* SHARMA 2004, *Gerarda prevostiana* MURPHY & VORIS 2014, *Gerarda prevostiana* WALLACH *et al.* 2014.

Diagnostic Characters: - Scales pattern 18:18:15. Sub caudal divided and 31, paired. Ventral 151, anal divided. One pre-ocular and two post-ocular. Supra labial 09, 3rd or 4th in contact with eyes and white or grey in colour. **Coloration:** - Glossy body with grey-brown or olive back and has a distinct ivory white or pale yellow lateral stripe from lip scale to tip of the tail. Size:-480 mm. **Distribution:** - Found in all coasts of India including Andaman Islands. Also found in similar habitat of Bangladesh, Cambodia, Indonesia, Malaysia, Myanmar, Singapore, Sri Lanka and Philippines. It is found in and near mangrove habitat of Gujarat coast.

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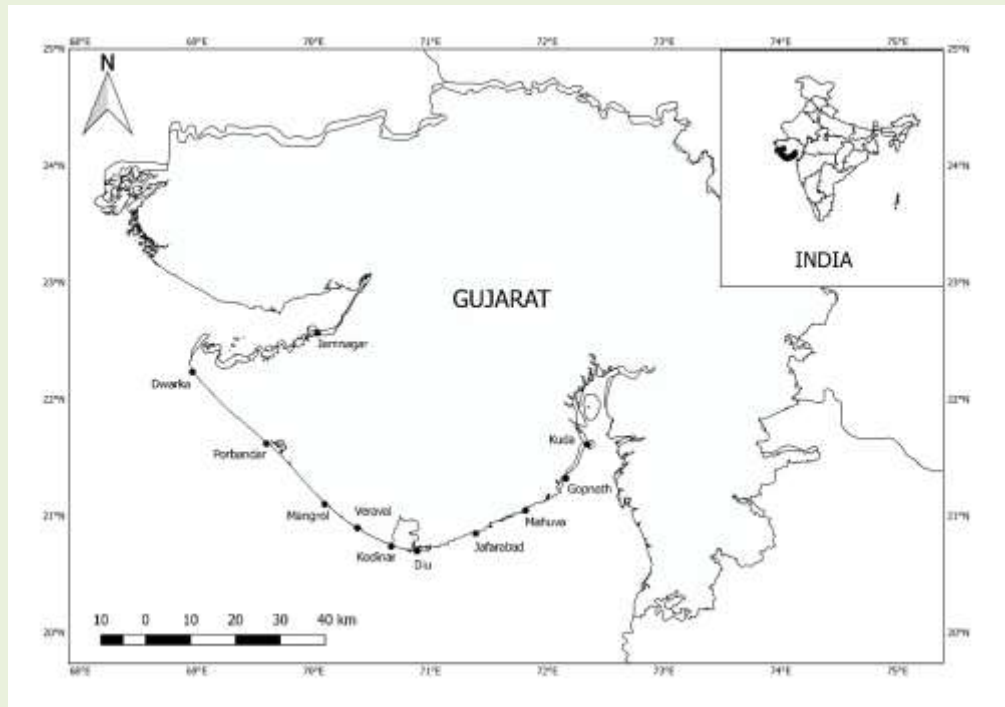


Figure.1 Map of the study area



Figure-2. Reported *Hydrophiinae* & Non-*Hydrophiinae* sea snakes from Saurashtra coast