

Study any large-scale map of Papua and most of the Seascape's islands appear to be in the middle of nowhere, just dots of land separated by a sweeping expanse of ocean. The paradox is that oceanic currents connect a great deal of the Bird's Head to distant regions in ways not revealed on most maps. Within a vast area of the equatorial Pacific known as the Coral Triangle, which includes the Philippines, Borneo, eastern Indonesia and all the territory east to the Solomon Islands, the Bird's Head is the sweet spot. Scientists believe that because significant larvae-bearing oceanic currents traverse the region, it functions like an incubator or "species factory", which partially seeds the entire Coral Triangle. Hard to deny when at least three-fourths of the Bird's Head's species are also present throughout the Coral Triangle.

The story in Cenderawasih Bay is a bit different. The marine life in the 15,000 square kilometer Cenderawasih Bay National Park, Indonesia's largest marine protected area, has also been affected by 14 million years of tectonic plate movement. But, instead of merging with its neighbors, Cenderawasih over time became more isolated as elongate fault slivers moved across the mouth of the bay impeding nutrient and larvae flow, especially when sea levels dropped. Even today the current story in Cenderawasih is more about currents *not* penetrating the bay's inner reaches. Separated from their relatives' gene pool, Cenderawasih fish populations developed peculiar traits, including odd color variations and the propensity of some deeper dwelling fish, Burgess's butterflyfish for instance, to inhabit much shallower water than any place else on earth. Cenderawasih coral communities are also highly unusual, with many unique growth forms and a predominance of *Porites*, *Montipora* and *Astreopora* species rather than the more typical *Acropora*-dominated reefs of the rest of the Coral Triangle.

Large numbers of endemics, species known only from the Bird's Head, thrive within the Seascape. So far scientists have recorded more than eight endemic mantis shrimp species, between 10 and 40 endemic corals (still under active study),

and over 35 endemic fish species. Walking sharks, nocturnal epaulette sharks that move over the bottom using their pectoral fins, seem to be especially picky about where they evolve. Triton Bay has its very own endemic walking shark, as do Raja Ampat and Cenderawasih Bay.

But there is another side to this marine life oasis. The same dynamic geological past that spawned the Seascape's marine habitats also left deposits of nickel and other minerals on many of the islands. Extracting the ore will undoubtedly have negative consequences for area reefs. There has been a surge in seismic exploration permits issued at the national level for Papua's undersea oil and gas deposits. Permits have been implemented without regard for sensitive cetacean migratory routes or inhabitants' concerns. Illegal fishing has damaged some habitats, and even the scant local population has impacted village reefs. Additionally, Indonesia must find ways of feeding its rapidly growing human population. Plans for industrial-scale agricultural production in Papua require cleared forests, which will result in sediment runoff that will suffocate nearby reefs. As the Seascape's own population develops, its needs will become more complex. Modern infrastructure construction, particularly roads, threatens coastal environments on those islands slated for development. Fortunately more than a decade of conservation work is countering these risks with practical science-backed plans designed to ensure that the Bird's Head Seascape, the global epicenter of marine biodiversity, not only survives but continues to flourish.

**Selected marine biodiversity species counts for the Bird's Head Seascape as of mid-2011.**

Region	Reef Fishes	Hard Corals*	Mantis Shrimp
Raja Ampat	1427	553	42
FakFak to Triton Bay	1005	471	28
Cenderawasih Bay	962	469	39
<b>Bird's Head Totals</b>	<b>1629</b>	<b>569</b>	<b>57</b>

\*Hard coral numbers include only known, described species. Scientists believe there are up to an additional 40 new species from the Bird's Head, which are currently under investigation.

## Endemic Marine Species of the Bird's Head Seascape

The Bird's Head Seascape of West Papua is not only the epicenter of marine biodiversity, it also appears to function as a "species factory", as evidenced by the large number of reef fishes and other fauna known only from this area. Currently, there are at least 35 coral reef fish species believed to be endemic to the Bird's Head, with an additional 5 to 40 endemic coral species and 8 endemic mantis shrimp. Below we provide descriptions of a number of these endemic species, as well as rare fish species that are known only from the Bird's Head and specific neighboring regions of northeastern Indonesia or Papua New Guinea. Keep your eyes open for these special fishes while diving the Bird's Head, or set out to discover your own new species!

*Dr. Mark Erdmann*

*Heteroconger* sp. Papuan garden eel. Recently discovered in 2010, one population is known from a silty inshore habitat in Cenderawasih Bay in depths of 15 to 20 meters, while the other was found in clean white coral sand on an offshore island in the Kaimana region in 25 to 35 meters depth. Ongoing work will soon determine if these are two different species and will provide name(s) for them.

*Astreopora acroporina*. Wallace, Turak and Devantier, 2011. One of 3 new *Astreopora* species discovered in Cenderawasih Bay in 2006, this unusual coral is found in the inshore coral-rich lagoons of coastal Cenderawasih Bay in depths of 1 to 3 meters. There are up to 40 endemic species of hard coral from the Bird's Head which are currently being examined closely by coral taxonomists.

*Odontodactylus* sp. Cenderawasih mantis shrimp. One of 8 endemic mantis shrimp found in the Bird's Head, this particular species is closely related to the peacock mantis shrimp, but is known only from Cenderawasih Bay in depths of 25 to 50 meters. It lives in burrows on sand and rubble slopes and will readily display to a diver's camera!





*Cirrhilabrus cenderawasih* Allen and Erdmann, 2006. Cenderawasih fairy wrasse. This beautiful wrasse is found on rubble slopes in 20 to 60 meters on Cenderawasih Bay's sheltered seaward reefs. Typically seen in groups of 10-20, including 1-5 males.



*Hemiscyllium freycineti* Quoy and Gaimard, 1824. Raja Ampat walking shark. Also known as a bamboo shark, this charismatic nocturnal species is common in shallow reef and sea grass beds throughout Raja Ampat, where it "walks" across the bottom in search of crustaceans and snails.



*Chromis unipa* Allen and Erdmann, 2009. UNIPA chromis. Discovered during a UNIPA (State University of Papua) fish taxonomy field course in November 2008, this beautiful damsel is known only from deep (40 to 70 meter) outer reef slopes of Tridacna and other atolls in Cenderawasih Bay.



*Lepadichthys* sp. Cenderawasih clingfish. A beautiful red and white striped clingfish discovered in 2010 in Cenderawasih Bay in 70 meters in association with coralline algae and sponges on steep outer reef slopes.



*Meiacanthus* sp. Cenderawasih fangblenny. A rare deep-dwelling species of fangblenny that was discovered in 2010 on the steep outer reef slopes of Cenderawasih Bay's atolls. Known only from depths of 60 to 70 meters.



*Eviota raja* Allen, 2001. Raja Ampat coral goby. A tiny, mid-water hovering goby that is found in sheltered, coral-rich bays throughout Raja Ampat.



*Paracheilinus nursalim* Allen and Erdmann, 2008. Nursalim's flasher wrasse. Known primarily from the FakFak and Kaimana coastlines, this beautiful flasher wrasse is seen in Raja Ampat only in southeastern Misool in depths of 20 to 35 meters. Watch for the male's stunning displays in late afternoon.



*Hemiscyllium henryi* Allen and Erdmann, 2008. Triton Bay walking shark. This relatively large epaulette shark was only discovered in 2006. It is found only in Triton Bay's shallow reef flats and rocky shore areas in 3 to 10 meters. Active only at night, the shark walks around on the bottom, feeding on crustaceans and small fish.



*Priolepis* sp. Papuan convict goby. This beautiful little goby (yet to be described) has only been photographed in Cenderawasih Bay and nearby Lembeh Strait in North Sulawesi. It lives under coral rubble in shallow (5 to 10 meters) coastal black sand environments.



*Calumia papuensis* Allen and Erdmann, 2010. Papuan gudgeon. Discovered in 2008, this stunning, tiny fish measures less than 2 centimeters. Although it was first discovered in Cenderawasih Bay, it was later found in FakFak and the neighboring Banda Sea in sheltered, coral-rich lagoonal environments between 20 to 50 meters.



*Hoplolatilus erdmanni* Allen, 2007. Erdmann's tilefish. Rarely seen above 40 meters, this tilefish lives on current-swept sandy bottoms, where it builds large mounds of coral rubble in which 2 to 6 individuals reside. A true Bird's Head endemic, this fish is found throughout the Bird's Head and nowhere else.



*Chrysiptera giti* Allen and Erdmann, 2008. Giti demoiselle. This pretty blue devil damselfish is found in coral-rich lagoonal environments in depths of 5 to 20 meters. To date it has been found only along the FakFak-Kaimana coastline and in nearby Sulawesi's Togian islands.



*Paracheilinus walton* Allen and Erdmann, 2006. Walton's flasher wrasse. Known only from Cenderawasih Bay, this brilliantly colored wrasse is found on rubble and *Halimeda* algae slopes below 20 meters. It is most active in the late afternoon when males display for their female harem.



*Hemiscyllium galei* Allen and Erdmann, 2008. Cenderawasih Bay walking shark. Like its sister species in Raja Ampat and Triton Bay, this is a nocturnal species found on shallow reefs and sea grass beds, where it uses its pectoral and pelvic fins to "walk" across the bottom in search of prey. Known only from Cenderawasih Bay.



*Vanderhorstia* sp. Wayag shrimp goby. A small but beautiful shrimp goby that is abundant on the lagoonal sand slope at 8 to 15 meters in front of the Wayag MPA field station in Raja Ampat. Soon to be described, and known only from Wayag.



*Calumia eilperini* Allen and Erdmann, 2010. Eilperin's gudgeon. Closely related to gobies, this striking gudgeon is known only from Cenderawasih Bay's sheltered, silty reefs. Found between 5 to 12 meters.



*Chromis athena* Allen and Erdmann, 2008. Athena chromis. Known only from the Fam Island group in the Dampier Strait region, this attractive gold-crested damsel is found in depths of 50 to 65 meters on steep outer reef slopes.



*Chrysiptera pricei* Allen and Adrim, 1992. Prices' demoiselle. This attractive damselfish, frequently associated with coral-rich habitats, only in Cenderawasih Bay, where it is found in shallow, sheltered (and often silty) bays throughout the region, from Yapen to Purup.



*Pterocaesio monikae* Allen and Erdmann, 2008. Monika's fusilier. Known only from Cenderawasih Bay, this dwarf fusilier is commonly found in schools of up to several hundred along steep outer reef slopes in the center of the bay between 5 to 50 meters.



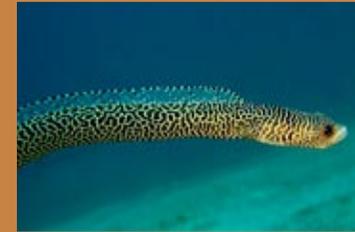
*Pseudochromis* sp. 3. Wandammen dottyback. This secretive and drab-colored dottyback is known only from the Wandammen Peninsula of Cenderawasih Bay, where it lives on silty coastal reefs between 3 to 8 meters and shelters under coral rubble and sponges.



*Pseudochromis matahari* Gill, Erdmann and Allen, 2009. Sunset dottyback. This aptly named dottyback is found in depths of 30 to 50 meters around sponges and coral outcrops on gradual sandy reef slopes in clear water. Known only from northern Raja Ampat and neighboring Halmahera.



*Manonichthys jamali* Allen and Erdmann, 2007. Jamal's dottyback. Found in southern Misool to Triton Bay, this dottyback inhabits dense coral thickets in 9 to 16 meters, where it mimics and preys upon the young of the common damselfish *Chromis retrofasciatus*.



*Heteroconger mercyae* Allen and Erdmann, 2009. Mercy's garden eel. This strikingly-patterned garden eel was found in the Tanjung Papisol region of Kaimana, in 5 to 10 meters on silty sand. It has also been photographed in Milne Bay in Papua New Guinea.



*Stalix* sp. Bird's Head jawfish. This inconspicuous jawfish, not yet described, has been found in silty bays in southeast Misool, Kokas Islands (FakFak) and Triton Bay in Kaimana. It is found in depths of 20 to 40 meters in small, mucus-lined holes in pure soft bottom environments.



*Pentapodus numberii* Allen and Erdmann, 2009. Numberi's whiptail. Named for Indonesia's Minister of Fisheries, this whiptail is found throughout the Bird's Head (and into neighboring Halmahera) in more turbid reef areas in 8 to 30 meters.



*Pictichromis caitlinae* Allen, Gill and Erdmann, 2008. Caitlin's dottyback. This beautiful and curious dottyback is only known from Cenderawasih Bay, where it will actively investigate divers that hover motionless over the reef. Typically seen on gradual slopes between 8 to 25 meters, it usually retreats into crevices in the sand/coral interface.



*Pseudochromis* sp. 1. Ammer's dottyback. Soon to be described in honor of BHS dive pioneer Max Ammer, this lovely dottyback is common throughout Raja Ampat amongst rubble at the base of reef slopes in 18 to 30 meters.



*Apogonichthyoides* sp. Misool cardinalfish. This deep-dwelling species was only discovered in early 2011. It was found at 70 meters under an overhanging coral head in Raja Ampat's southeast Misool.



*Forcipiger* sp. Cenderawasih long-nosed butterflyfish. Another apparent Cenderawasih Bay endemic, this conspicuous species (with dusky body coloration compared to its bright yellow cousins) is found in coral rich environments between 3 to 15 meters.



*Pomacentrus fakfakensis* Allen and Erdmann, 2008. FakFak damselfish. This brown damsel with blue-fringed fins is known only from shallow, silty reefs in 3 to 8 meters from the FakFak-Kaimana coastline



*Lubbockichthys* sp. Cenderawasih dottyback. This deep-dwelling dottyback was discovered in 2010 in caves at 50 to 70 meters along the outer steep walls of Cenderawasih Bay atolls. Males and females display different coloration; females are red with a yellow tail and the males are more overall drab olive with only a hint of red.



*Pseudochromis erdmanni* Gill and Allen, 2011. Erdmann's dottyback. This fearsome-looking, aggressive dottyback (maximum length 10 centimeters) has been found in Raja Ampat and Halmahera, Ambon and North Sulawesi. Found on deep slopes below 35 meters, it associates with solitary sponges and soft corals in silty coastal sand environments. Female is yellowish.



*Pseudochromis* sp. 2. Wayag dottyback. This secretive dottyback is found on the ceilings of karst overhangs and caves in northern Raja Ampat, and is particularly common in the Wayag-Uranie island chain. It appears to be a new species endemic to Raja Ampat.



*Apogon oxygrammus* Allen, 2001. Papuan cardinalfish. A deepwater (40 to 50 meters) cardinal that prefers coastal reefs, it is found on rocky outcrops on silty or Halimeda algal-covered bottoms.

**Additional Bird's Head endemics not pictured:**

- Pseudochromis jace*
- Kalyptatherina helodes*
- Siphamia ctenotes*
- Opistognathus rufilineatus*

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