

## BIOLOGICAL INDICATOR OF 2014–15 WARMING CONDITIONS: PRESENCE OF THE MEXICAN LOOKDOWN (*SELENE BREVOORTII*), PACIFIC TRIPLETAIL (*LOBOTES PACIFICUS*) AND CORTEZ BONEFISH (*ALBULA GILBERTI*) IN THE TEMPERATE EASTERN PACIFIC OF MEXICO

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### ABSTRACT

Two Panamic fish species and one species from the Cortez–San Diegan Provinces were recorded for the first time in and near Bahía de San Quintín, Baja California, Mexico, during 2014 and 2015. The area is normally cold because of locally intense upwelling. However, during 2014 and 2015, warm water prevailed, which appears to have led to the presence of these fish species within and outside of the bay. Five specimens of *Selene brevoortii* (Mexican lookdown) were recorded, one individual in October 2014, and three more individuals during July 2015; another specimen, completely dry, was provided by a fisherman as evidence of their presence at an intermediate date within this period. Also in 2015, seven individuals of fish were captured with a commercial gill net set just outside of the bay; five of these were identified as *Lobotes pacificus* (Pacific tripletail) and the other two individuals as *Albula gilberti* (Cortez bonefish). Captures of these tropical species, in an usually cold-water environment are evidence of a substantial fish movement from the tropical Pacific toward the temperate waters of Baja California and California, USA, during warming conditions.

### INTRODUCTION

In the coastal area of the eastern Pacific Ocean, climatic and oceanographic changes have occurred during El Niño events, and this has favored the presence of tropical fish species in the temperate zone extending their distribution to the north; this has been documented in California during warm events with the presence of carangid fishes (Lea and Walker 1995; Love et al. 2015), and many other Panamic fish species (Lea and Rosenblatt 2000).

In the temperate coastal zone of northern Baja California, the presence of tropical species associated with warm events, such as the white grunt (*Haemulon leuciscus*; Rosales-Casián and Ruiz-Campos 1999), the bigscale goatfish (*Pseudupeneus grandisquamis*), the bullseye puffer (*Sphoeroides annulatus*), the Paloma pompano (*Trachinotus paitensis*; Rosales-Casián 2004b), and the roosterfish (Rosales-Casián 2013) have also been documented.

A large patch of anomalously warm water appeared off Alaska and subsequently stretched south to Baja California during 2013–14, and was named “The Blob” (Bond et al. 2015). In February 2014, the El Niño Southern Oscillation (ENSO) Alert system of the National Oceanic and Atmospheric Administration (NOAA) reported positive subsurface temperature anomalies across the east-central Pacific, although neutral conditions remained for the Northern Hemisphere in spring 2014; the alert status changed from ENSO non-active to El Niño Watch in March 2014 (NOAA 2014); this condition continued until September, when it showed a weak El Niño, and in April 2015 reflected a strong El Niño episode; after dominating the Pacific for more than a year, El Niño ended in May 2016 (NOAA 2016).

These two anomaly events kept the temperate environment warm for a long period and favored the northward movements of fishes. The present work documents the presence of the fish species caught by coastal commercial fishing and sportfishing in the area of San Quintín, Baja California, Mexico: the Mexican lookdown (*Selene brevoortii*; Gill 1863), the Pacific tripletail (*Lobotes pacificus*; Gilbert 1898) and the Cortez bonefish (*Albula gilberti*; Pfeiler and van der Heiden 2011). Also, the previous records of first time occurrence are presented for two fish species in California waters (*S. brevoortii* by Lea and Walker 1995; *Lobotes pacificus* by Rounds and Feeney 1993), and a brief discussion of *Albula gilberti* (Pfeiler et al. 2011).

### METHODS

To document both sportfishing and artisanal commercial fishing, monthly surveys were conducted from 2014–16 in Bahía de San Quintín (fig. 1), an embayment over 300 km south of the US–Mexico border. During this time, vessels returning from outside of the bay were monitored at the Old Mill site. Identification for temperate fishes from the San Quintín coastal area is usually done with the Miller and Lea (1972) guide as well as with the rockfishes work by Love et al. (2002), but in the case of those considered warm fish species I used the work of Allen and Robertson (1998), and Humann and Deloach (2004).

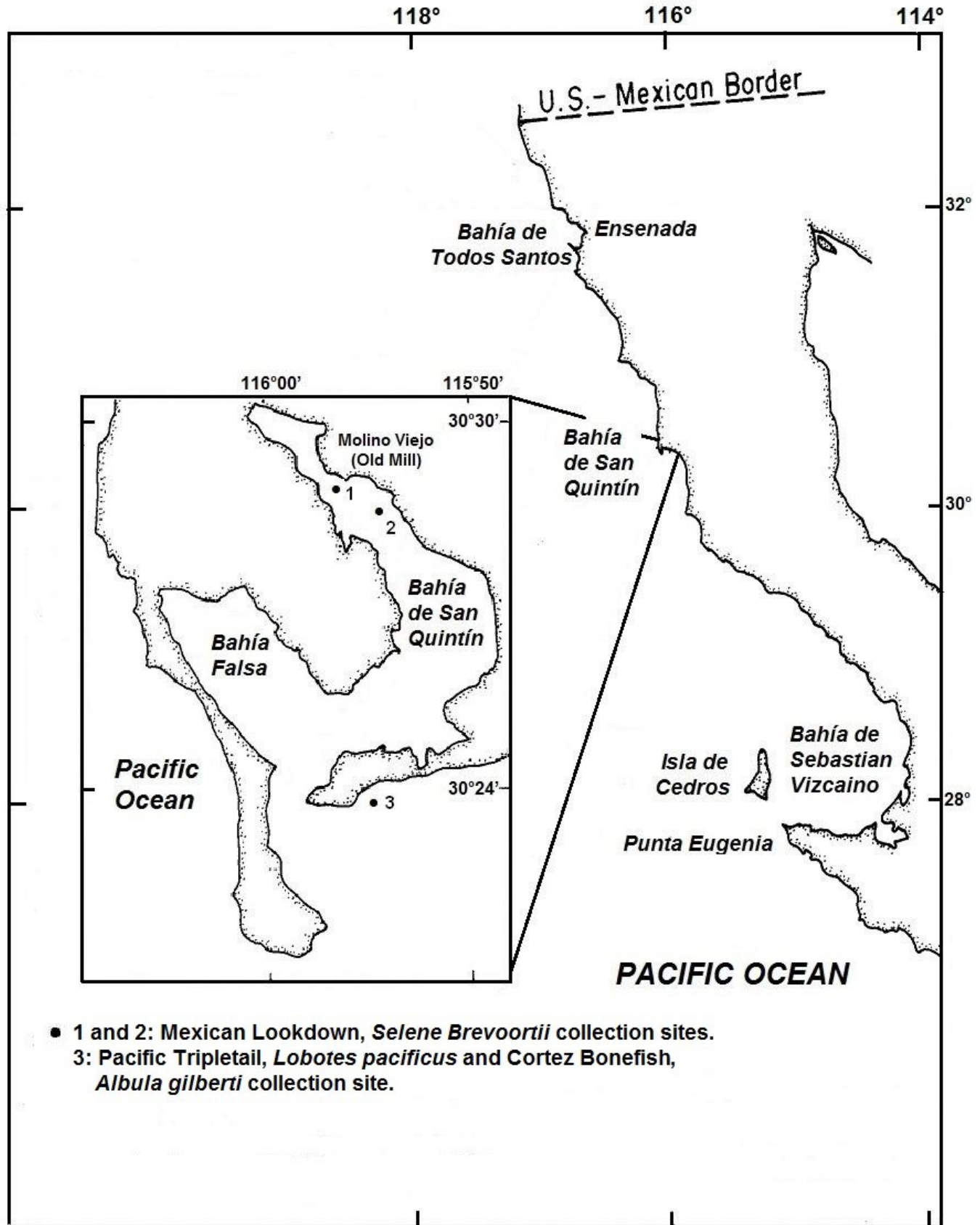


Figure 1. Catch sites of Mexican lookdown, Pacific tripletail and Cortez bonefish in the area of San Quintin, Baja California, Mexico.



Figure 2. Individuals of Mexican lookdown, *Selene brevoortii*, captured in Bahia de San Quintin, Baja California, Mexico.

TABLE 1  
 Lengths (mm), weights (g), sites, surface temperature (°C) and dates of tropical fish species captured in the area of San Quintin, Baja California, Mexico.

Fish species	Length Total	(mm) Standard	Weight (g)	Site	Temp. °C	Date
<i>Selene brevoortii</i>	225	160	120	San Quintin Bay	20.9	23 Oct. 2014
	165	130	63		28.9	11 July 2015
	176	135	69		11 July 2015	
	184	140	79		11 July 2015	
Dry	136	98	10			2015
<i>Lobotes pacificus</i>	500	415	1803	San Quintin Coast	16.7	28 March 2015
	610	535	3564			28 March 2015
	480	420	1802			28 March 2015
	490	425	1962			28 March 2015
	550	480	2809			28 March 2015
<i>Albula gilberti</i>	380	210	369	San Quintin Coast	16.7	28 March 2015
	360	300	357			28 March 2015

## RESULTS

### *Selene brevoortii*

During 2014 and 2015, there were two separate collections of living *Selene brevoortii* (Mexican lookdown, family Carangidae) (Spanish: *jorobado mexicano*; Page et al. 2013) inside of Bahia de San Quintin, Baja California, Mexico. The first individual was captured in the main channel (fig. 2; table 1), against the piling remnants of an old pier, on 23 October 2014 (30.4649 N, 115.9099 W). Three more individuals were captured in the same chan-

nel but close to an old rocky jetty and the Old Mill boat ramp on 11 July 2015 (table 1). Both collections were made with small lures (Sabiki rigs) by the sportfishing anglers trying to catch live bait (Pacific mackerel, *Scomber japonicus*). In addition, another individual of *S. brevoortii*, this one dried, was provided to me on 13 February 2016 from Bahia de San Quintin, an evidence that it was captured at an unknown date within the bay, but certainly during 2015 (fig. 3, table 1).

These individuals were identified based on the following characteristics: body strongly compressed, pen-





Figure 3. Dry individual of Mexican lookdown, *Selene brevoortii*, from Bahía de San Quintín, Baja California, Mexico.

tagonal-shaped strongly, a depth up to 60% of standard length; the entire body of fresh specimens was silvery color with a deep head and a steep concave forehead and snout profile; caudal fin is deeply forked, and curved pectoral and anal fins (Jarvis et al. 2009). The body is scaleless, and lateral line scutes are poorly differentiated (Smith-Vaniz et al. 2010). The specimens presented: dorsal fin: VIII+1, 21–23; pectoral fin: 18–19; anal fin: I, 18; gill rakers: 8 + 31–32. Fresh individuals of *S. brevoortii* measured from 165 to 225 mm total length LT (table 1).

#### ***Lobotes pacificus* and *Albula gilberti***

On 28 March, 2015, a commercial fishing trip captured seven tropical fish individuals with a 100 m long gillnet (6 inches mesh light). The individuals were caught in the nearshore off Bahía de San Quintín (fig. 1), on sandy bottom, 8–10 m depth, and close to the Punta Azufre sandbar, east side of the bay's mouth, 30.2924 N,

115.9737 W (fig. 1). When fish were measured, all were without viscera.

After reviewing the fishes, five individuals were identified as *Lobotes pacificus*, the Pacific tripletail (Spanish: *dormilona del Pacífico*; Page et al. 2013). These specimens were olive in color; robust, deep and moderately compressed body (fig. 4); the dorsal, anal, and caudal fins resemble three tails or a rounded caudal fin; preopercle was visibly serrated and covered with scales; the specimens had a continuous dorsal fin with 12 spines and 15 rays, and anal fin with three spines and 11 rays. All the characteristics agree with *L. pacificus*, family Lobotidae (Froese and Pauly 2016). Tripletails captured in San Quintín presented sizes from 480 to 610 mm LT (table 1).

In the same gill net set, two captured fish were identified as bonefish, *Albula* sp. (fig. 5). Both specimens exhibited an elongated and fusiform body, with a con-





Figure 4. Individual of Pacific tripletail, *Lobotes pacificus*, captured off Bahia de San Quintin, Baja California, Mexico.



Figure 5. Individuals of Cortez bonefish, *Albula gilberti*, captured off Bahia de San Quintin, Baja California, Mexico.

cal snout extending slightly beyond the lower mouth; a silver body with yellow pectoral fins; region of the head without scales. Dorsal fin with 15 soft rays, anal fin with seven soft rays. These characteristics coincide with the genus *Albula* (Froese and Pauly 2016), and Pfeiler et al. (2011) separated all of the bonefish distributed on the outer coast of Baja California and off southern

California as the Cortez bonefish (*Albula gilberti*, family Albulidae; Spanish: *macabí de Cortes*). The two individuals measured 360 mm and 380 mm LT (table 1).

Temperatures within the bay measured between 20.9°C in October 2014 and 28.9°C in July 2015, and in the coastal zone registered 16.7°C in March 2015 (table 1).

## DISCUSSION

In the eastern North Pacific, anomalous warm conditions started at the end of 2013 and this surface water remained significantly warmer from 2014 to 2015 (Bond et al. 2015; Dewey 2015). The temperature increases along the North American Pacific coast allowed a range of tropical fish species to move north as the bigeye scad, *Selar crumenophthalmus* (Carangidae), found in California waters during 2015 (Love et al. 2015). Further north in waters of British Columbia, Canada, the warm-temperate affinity species, finescale triggerfish (*B. polyepis*), was found during 2014 (Brooks et al. 2016).

All three species, the Mexican lookdown, the Pacific tripletail, and the Cortez bonefish reported in the present study are known, from rare occurrences, off southern California, north of our study site (Lea and Walker 1995; Rounds and Feeney 1993; Pfeiler et al. 2011). However, what is particularly noteworthy is that in the 30 years of sampling along the Pacific coast of northern Baja California this was the first time that these three tropical fish species were observed; fish studies include the *Macrocystis pyrifera* beds of Bahia de Todos Santos (Diaz-Diaz and Hammann 1987) and south of the bay at Kennedy's Camp (Moreno-Mendoza 2016); the soft-bottom of Bahia de Todos Santos (Rosales-Casián 1997a) and Bahia El Rosario, Punta Baja (Rosales-Casián 2011); the coastal lagoons as Punta Banda estuary (Rosales-Casián 1997b) and Bahia de San Quintin (Rosales-Casián 1996, 2004a,b), the catch of artisanal fishing in commercial fishing camps along Pacific coast (Rosales-Casián and Gonzalez-Camacho 2003), unpublished data of the Bahia de Santa Rosalilita (28°40'N, 114°15'W) at 650 km from California border (Rosales-Casián), USA, and the last study about the fishes of Ojo de Liebre (Scamoon) lagoon (Civico-Collados 2017). Of particular importance, Bahia de San Quintin is one of the most important lagoons in the Pacific coast of Baja California due to its high productivity of phytoplankton, seagrasses, and by the presence of a permanent upwelling near the mouth (Lara-Lara and Alvarez-Borrego 1975; Poumian-Tapia 1995; Rosales-Casián 1996; Gracia-Escobar et al. 2015). The lagoon is considered a cold site (11.2° to 18.6°C) because upwelling water is transported to the interior by tidal currents (Rosales-Casián 1997b; 2011).

Mexican lookdown, the Pacific tripletail, and the Cortez bonefish are considered tropical or subtropical species (Robertson and Allen 2015) with a Pacific distribution (Page et al. 2013), however their presence in temperate environments of northern Baja California coasts is possibly attributed to the anomalous higher temperatures that impacted the epipelagic ecosystem of the California current from the end of 2013 and during 2014–15 (Gómez-Ocampo et al. 2017). Those anomalous condi-

tions were significantly warmer than the last few decades and impacted the entire west coast of North America (Bond et al. 2015; Dewey 2015).

The Mexican lookdown is a Panamic species (Carangidae) that was recorded before the 1990s as far north as Bahia Magdalena, Baja California Sur, Mexico, including the lower half of the Gulf of California (Robertson and Allen 2015). Much further north, one individual of this species was captured for the first time in San Diego Bay, California (USA), on 4 February 1993, and was considered a northward movement related to the warm-water oceanographic conditions that prevailed during 1992–93 (Lea and Walker 1995). On 18 November 2008, two juvenile Mexican lookdowns (62 and 63 mm standard length) were collected with beach seine hauls in Seal Beach, California (north of San Diego Bay), close to the warm water effluent of a power generation station; both juveniles had a characteristic long filamentous ray in their anterior dorsal spine and larger pelvic fins (Jarvis et al. 2009; Smith-Vaniz 1995; Humann and Deloach 2004).

The Carangidae family is distributed in Canada, the United States, and Mexico, and is composed of 55 species with 16 genera, and are named pompanos, jacks, and lookdowns (Page et al. 2013). Mexican lookdown shares its distribution with two other species in the sandy bottoms of the Mexican Pacific (nearshore and estuaries), including the Gulf of California: *Selene orstedii* and *S. peruviana* (Lea and Walker 1995; Snow 2016). No individuals of *S. brevoortii* were collected before in temperate nearshore sites in the Northern Pacific Baja California (Rosales-Casián 1997a, b, 2004a, b, 2011), but were recorded in California waters during warm periods in 1993, and 1997–98 (Lea and Walker 1995; Lea and Rosenblatt 2000; Jarvis et al. 2009).

Pacific tripletail, *L. pacificus* (Lobotidae), is distributed in tropical areas in the eastern Pacific from the Gulf of California to Peru (Froese and Pauly 2016). The name in Spanish, “*dormilona*” (sleepyhead) is because individuals can remain sideways on the surface and look like a dark leaf (Allen and Robertson 1998). A first record of tripletail was reported in California waters during the strong 1992–93 El Niño, however was identified as *Lobotes surinamensis* (Rounds and Feeney 1993). In the warming event of the present study, three individuals were captured by sportfishing anglers in San Diego Bay ([www.sportfishingmag.com](http://www.sportfishingmag.com) 27 August 2014), and another from the Ocean Beach pier (<http://sdfish.com/forums/> 28 August 2014). It is a species rarely seen, although, when caught, it is usually during the warmest summer months (Snow 2016).

With respect to bonefish, previously genetically distinct species from the eastern Pacific were grouped in the *Albula vulpes* complex or *Albula* species (Nelson



et al. 2004). However, Pfeiler et al. (2011) made a formal description, genetic characterization, and comparisons with several relatives, and separated it as Cortez bonefish (*Albula gilberti*, Pfeiler and van der Heiden 2011) the species that is distributed throughout the Gulf of California and up to Morro Bay, California, USA (Page et al. 2013). Previous records of bonefish in the San Diego Bay were named as *Albula vulpes*, during the warm years of 1998 (Allen 1999) and 2008 (Pondella et al. 2009).

The occurrence of the Panamic fish species inside and outside of the Bahía de San Quintín is important as a biological indicator of northward fish movement, and coincident with warm water oceanographic conditions (Bond et al. 2015; Dewey 2015). These fish increase the list of species with tropical affinity that have been registered in the San Quintín area during El Niño 1997–98 event as the bigscale goatfish (*Pseudupeneus grandisquamis*), the white grunt (*Haemulopsis leuciscus*), the bullseye puffer (*Sphoeroides annulatus*), and the Paloma pompano, *Trachinotus paitensis* (Rosales-Casián 2004b), and in the coastal area, the tropical-warm-temperate species such as the finescale triggerfish (*B. polylepis*) captured during warm conditions of 2011 (Rosales-Casián 2013).

## ACKNOWLEDGEMENTS

I appreciate the revision to this manuscript by Milton Love (University of California, Santa Barbara), and Dan Pondella (Vantuna Research Group, Occidental College), and one anonymous reviewer, which substantially improved the manuscript with their comments. Thanks to Mr. Alberto Flores (*Tiburón* sportfishing boats) from Old Mill, Bahía de San Quintín, Baja California (Mexico), for providing all fish species specimens, and the catch information. This research was financed by the Centro de Investigación Científica y Educación Superior de Ensenada, B.C. (CICESE).

## LITERATURE CITED

- Allen, G. R., and D. R. Robertson. 1998. Peces del Pacífico Oriental Mexicano. CONABIO, Ciudad de México, 327 pp.
- Allen, L. G. 1999. Fisheries inventory and utilization of San Diego Bay, San Diego, California. Final report for contract to the U.S. Navy Naval Engineering Naval Command Southwest Division and the San Diego Unified Port District, 138 pp.
- Bond, N. A., M. F. Cronin, H. Freeland, and N. Mantua. 2015. Causes and impacts of the 2014 warm anomaly in the NE Pacific. *Geophys. Res. Lett.* 42:3414–3420.
- Brooks, A., G. Hanke, C. Foote, G. Gillespie, and J. Bedard. 2016. First Records of Finescale Triggerfish (*Balistes polylepis*) and Louvar (*Luvarus imperialis*) in British Columbia, Canada. *Northwestern Naturalist*, 97(1):7–12.
- Cívico-Collados, L. 2016. Estructura de la comunidad de peces y captura comercial estacional en la Laguna Ojo de Liebre, B.C.S., México durante 2015–16. M.Sc. Dissertation. Centro de Investigación Científica y de Educación Superior de Ensenada, B.C. México, 78 pp.
- Dewey, R. 2015. Warm North East Pacific Ocean conditions continue into 2015. *Ocean Networks Canada*—Newsletter. Available at: <http://www.ocean-networks.ca/warm-north-east-pacific-ocean-conditions-continue-2015/>.
- Díaz-Díaz, M. E., and M. G. Hammann. 1987. Relaciones tróficas de los peces asociados a un manto de *Macrocystis pyrifera* en la Bahía de Todos Santos, Baja California, México. *Ciencias Marinas* 13:81–96.
- Froese, R., and D. Pauly 2016. Fishbase. World Wide Web electronic publication [www.fishbase.org](http://www.fishbase.org), version (10/2016).
- Gómez-Ocampo, E., G. Gaxiola-Castro, R. Durazo, and E. Beier. 2017. Effects of the 2013–16 warm anomalies on the California Current phytoplankton. Deep-Sea Research II <http://dx.doi.org/10.1016/j.dsr2.2017.01.005>.
- Gracia-Escobar, M. F., R. Millán-Núñez, E. Valenzuela-Espinoza, A. González-Silvera, and E. Santamaría-del-Ángel. 2015. Changes in the Composition and Abundance of Phytoplankton in a Coastal Lagoon of Baja California, México, during 2011. *Open J. Mar. Sci.* 5: 69–181.
- Humann, P., and N. Deloach. 2004. Reef fish identification, Baja to Panama. New World Pub. Inc. Jacksonville, 343 pp.
- Jarvis, E. T., H. Glianik, O. Horning, and C. Linardich. 2009. Occurrence of juvenile Mexican lookdown, *Selene brevoortii* (Gill, 1863), in Seal Beach, California. *Calif. Fish and Game* 95(4):188–192.
- Lara-Lara, J. R., and S. Álvarez-Borrego. 1975. Ciclo anual de clorofilas y producción orgánica primaria en Bahía San Quintín, B.C. *Ciencias Marinas* 2(1):77–97.
- Lea, R. N., and R. H. Rosenblatt. 2000. Observations on fishes associated with the 1997–98 El Niño off California. *Calif. Coop. Oceanic. Fish. Invest. Rep.* 41:117–129.
- Lea, R. N., and H. Walker. 1995. Record of the bigeye trevally, *Caranx sexfasciatus*, and Mexican lookdown *Selene brevoortii*, with notes on other carangids from California. *Calif. Fish and Game*. 81(3): 89–95.
- Love, M. S., M. Yoklavich, and L. Thorsteinson. 2002. The rockfishes of the Northeast Pacific. University of California Press, Los Angeles. 405 pp.
- Love, M., S. J. K. Passarelli, C. Okamoto, and D. W. Diehl. 2015. The bigeye Scad, *Selar crumenophthalmus* (Bloch, 1793) (Family Carangidae), new to the California marine fauna, with a list to and keys for all California Carangids. *Bull. South. Calif. Acad. Sci.* 114(3):141–148.
- Miller, D. J., and R. N. Lea. 1972. Guide to the coastal marine fishes of California. *Calif. Dept. Fish Game, Fish Bull.* 157. 235 pp.
- Moreno-Mendoza, R. J. 2016. Estructura comunitaria de los peces asociados a bosques de macroalgas en Campo Kennedy, Ensenada, Baja California, México. M.Sc. Dissertation. Centro de Investigación Científica y de Educación Superior de Ensenada, B.C. México. 48 pp.
- Nelson, J. S., E. J. Crossman, H. Espinosa-Pérez, L. T. Findley, C. R. Gilbert, R. N. Lea, and J. D. Williams. 2004. Common and scientific names of fishes from the United States, Canada, and Mexico. Sixth edition. American Fisheries Society, Special Publication 29, Bethesda, Maryland. 386 pp.
- NOAA 2014. El Niño/Southern Oscillation (ENSO) Diagnostic Discussion. Available at [http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/enso\\_disc\\_mar2014/](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_disc_mar2014/).
- NOAA 2016. El Niño/Southern Oscillation (ENSO) Diagnostic Discussion. Available at [http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/enso\\_disc\\_jun2016/ensodisc.pdf](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_disc_jun2016/ensodisc.pdf).
- Page, L. M., H. Espinosa-Pérez, L. T. Findley, C. R. Gilbert, R. N. Lea, N. E. Mandrak, R. L. Mayden, and J. S. Nelson. 2013. Common and scientific names of Fishes from the United States, Canada, and Mexico, 7th ed. American Fisheries Society, Special Publication 34, Bethesda. 384 pp.
- Pfeiler, E., A. M. van der Heiden, R. S. Ruboyanes, and T. Watts. 2011. *Albula gilberti*, a new species of bonefish (Albuliformes: Albulidae) from the eastern Pacific, and a description of adults of the parapatric *A. esuncula*. *Zootaxa* 3088:1–14.
- Pondella, D. J., and J. P. Williams. 2009. Fishery inventory and utilization of San Diego Bay, San Diego, California for surveys conducted in April and July 2008. Vantuna Research Group, Moore Laboratory of Zoology, Occidental College 1600 Campus Rd., Los Angeles, CA 90041, February 2009.
- Poumian-Tapia, M. 1995. Sobre la cuantificación de la biomasa de *Zostera marina* L. en Bahía San Quintín BC, durante un ciclo anual. M.Sc. Dissertation. Centro de Investigación Científica y de Educación Superior de Ensenada, B.C. México. 152 pp.
- Robertson, D. R., and G. R. Allen. 2015. Shorefishes of the tropical eastern Pacific online information system. Version 2.0 Smithsonian Tropical Research Institute, Balboa, Panama. <http://biogeodb.stri.si.edu/fstep/en/pages>. Accessed 11 April 2016.
- Rosales-Casián, J. A. 1996. Ichthyofauna of Bahía de San Quintín, Baja California, México, and its adjacent coast. *Ciencias Marinas* 22(4):443–458.
- Rosales-Casián, J. A. 1997a. Estructura de la comunidad de peces y el uso de los ambientes de bahías, lagunas y costa abierta en el Pacífico Norte de Baja California. Ph.D. Dissertation. Centro de Investigación Científica y de Educación Superior de Ensenada, B.C. México. 201 p.

- Rosales-Casián, J. A. 1997b. Inshore soft-bottom fishes of two coastal lagoons on the northern Pacific coast of Baja California. Calif. Coop. Oceanic. Fish. Invest. Rep. 38:180–192.
- Rosales-Casián, J. A. 2004a. Composition, importance and movement from San Quintin Bay, Baja California, México. Ciencias Marinas 30(1A):109–117.
- Rosales-Casián, J. A. 2004b. Tropical fish species as indicator of 1997–98 El Niño in Bahía de San Quintín, Baja California, México. Bull. South. Calif. Acad. Sci. 103(1):20–23.
- Rosales-Casián, J. A. 2011. The fish assemblages from the nearshore area of Punta Baja, B.C., México, the southern limit of the Southern California Bight. Calif. Coop. Oceanic. Fish. Invest. Rep. 52: 162–181.
- Rosales-Casián, J. A. 2013. Finescale Triggerfish (*Balistes polylepis*) and Roosterfish (*Nematistius pectoralis*) Presence in Temperate Waters off Baja California, México: Evidence of El Niño Conditions. Calif. Coop. Oceanic. Fish. Invest. Rep. 54:81–84.
- Rosales-Casián, J. A., and J. R. Gonzalez-Camacho. 2003. Abundance and importance of fish species from the artisanal fishery on the Pacific coast on Northern Baja California. Bull. South. Calif. Acad. Sci. 102(2):51–65.
- Rosales-Casián, J. A. and G. Ruiz-Campos. 1999. Northern range extension of the white grunt, *Haemulopsis leuciscus*. Calif. Fish and Game. 85(3):135–138.
- Rounds, J. M. and R. F. Feeney. 1993. First record of the tripletail (*Lobotes surinamensis*, family Lobotidae) in California waters. Calif. Fish and Game. 79:167–168.
- Smith-Vaniz, W. F. 1995. Carangidae. Jureles, pámpanos, cojinúas, zapateros, cocineros, casabes, macarelas, chicharros, jorobados, medregales, pez pilota. In Guia FAO para Identificación de Especies para los Fines de la Pesca. Pacífico Centro-Oriental, W. Fischer, F. Krupp, W. Schneider, C. Sommer, K.E. Carpenter and V. Niem, eds. Rome: FAO, pp. 940–986.
- Smith-Vaniz, B., R. Robertson, A. Dominici-Arosemena and H. Molina. 2010. *Selene brevoortii*. The IUCN Red List of Threatened Species 2010: e.T183636A8148902. Available at <http://dx.doi.org/10.2305/IUCN.UK.2010-3.RLTS.T183636A8148902.en>.
- Snow, J. 2016. Mexico, fish, flora and fauna: Photos and species information of Baja California. Mexican lookdown, *Selene brevoortii*. <http://www.mexfish.com/mexico/mexican-lookdown/>. Accessed 07 March 2017.