

Lionfish Knowledge Exchange Workshop

Adressing Invasive Alien Species Threats at Key Marine Biodiversity Areas Project



Economic loss: the case of pufferfish and lessons for lionfish

Vahdet ÜNAL



This project is being implemented by Directorate General for Nature Conservation and National Parks under the Ministry of Agriculture and Forestry and UNDP with the financial support of Global Environment Facility (GEF).

- The Mediterranean is the most invaded sea on the planet, hosting nearly 1000 marine alien species of which more than half are considered to be established and spreading...
- Marine alien species may become invasive and displace native species, cause:
 - prevent the provision of ecosystem services,
 - the loss of native genotypes,
 - change community structure,
 - affect food-web properties and
 - modify habitats,



Source: Grosholz, 2002; Wallentinus and Nyberg, 2007; Molnar et al., 2008; Vilà et al., 2010; Zenetos et al., 2010, 2012; Katsanevakis et al. 2014; Katsanevakis et al., in press.

Alien Marine Fishes Deplete Algal Biomass in the Eastern Mediterranean

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Abstract

One of the most degraded states of the Mediterranean rocky infralittoral ecosystem is a barren composed solely of bare rock and patches of crustose coralline algae. Barrens are typically created by the grazing action of large sea urchin populations. In 2008 we observed extensive areas almost devoid of erect algae, where sea urchins were rare, on the Mediterranean coast of Turkey. To determine the origin of those urchin-less 'barrens', we conducted a fish exclusion experiment. We found that, in the absence of fish grazing, a well-developed algal assemblage grew within three months. Underwater fish censuses and observations suggest that two alien herbivorous fish from the Red Sea (*Siganus luridus* and *S. rivulatus*) are responsible for the creation and maintenance of these benthic communities with extremely low biomass. The shift from well-developed native algal assemblages to 'barrens' implies a dramatic decline in biogenic habitat complexity, biodiversity and biomass. A targeted *Siganus* fishery could help restore the macroalgal beds of the rocky infralittoral on the Turkish coast.

Citation: Sala E, Kizilkaya Z, Yildirim D, Ballesteros E (2011) Alien Marine Fishes Deplete Algal Biomass in the Eastern Mediterranean. PLoS ONE 6(2): e17356. doi:10.1371/journal.pone.0017356

-impact human health, and

-cause substantial economic losses

L. sceleratus creates significant problems for both the ecosystem and the fishers...





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April 2005

First confirmed record of *Lagocephalus sceleratus* (Gmelin, 1789) in the Mediterranean Sea

O. AKYOL*, V. ÜNAL, T. CEYHAN AND M. BILECENOGLU

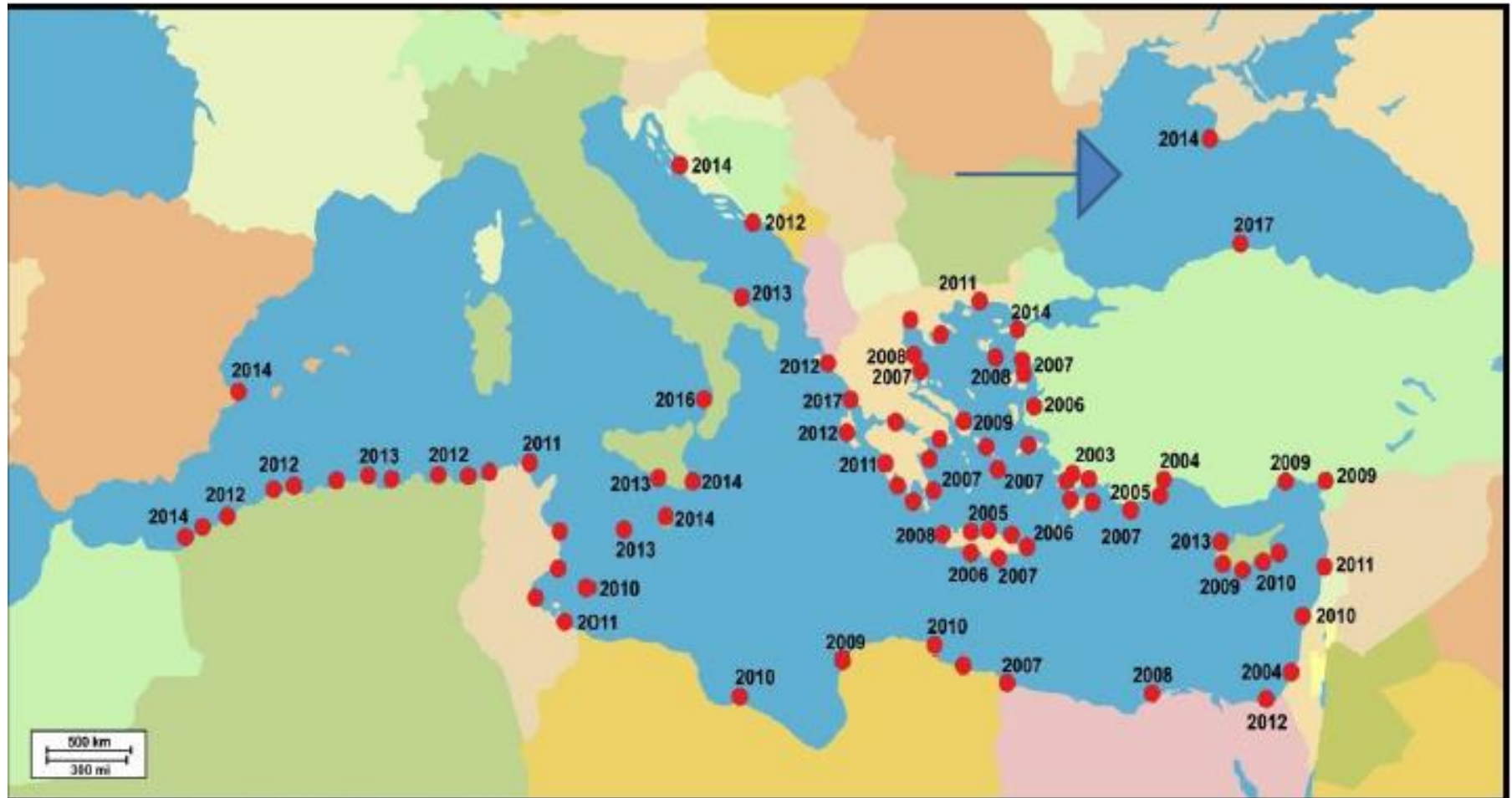
Faculty of Fisheries, Ege University, Bornova 35100, Izmir, Turkey

(Received 2 April 2003, Accepted 10 December 2004)

One specimen of the Indo-Pacific silverstripe blaasop *Lagocephalus sceleratus* (Gmelin, 1789) (Tetraodontidae) is recorded from the Aegean coast of Turkey and is confirmed for the Mediterranean. Dispersal of the species to the Mediterranean is due to migration from the Red Sea *via* the Suez Canal.

© 2005 The Fisheries Society of the British Isles

Key words: *Lagocephalus sceleratus*; Lessepsian migration; Mediterranean; Tetraodontidae.



Recent distribution of *L. scleratus* along the Mediterranean and Black Sea (modified and updated from Galanidi, M and Zenetos, A., 2019; Bilecenoğlu and Öztürk, 2018)

! **ATENCIÓN
PESCADO
PELIGROSO
NO COME!**

! **ATTENZIONE
PESCE PERICOLOSO
NON MANGIARE!**

! **ATTENTION
HAZARDOUS FISH
DO NOT EAT!**

**2.000.000 Euro loss in
2011-2012**

TOXIC
Fishing Notification No: 2008/48
"Landing is prohibited!"

WANTED



**1 EURO DEAD
OR ALIVE**

**5.000.000 Euro loss in
2013-2014**

**2003
SURPRISE!**

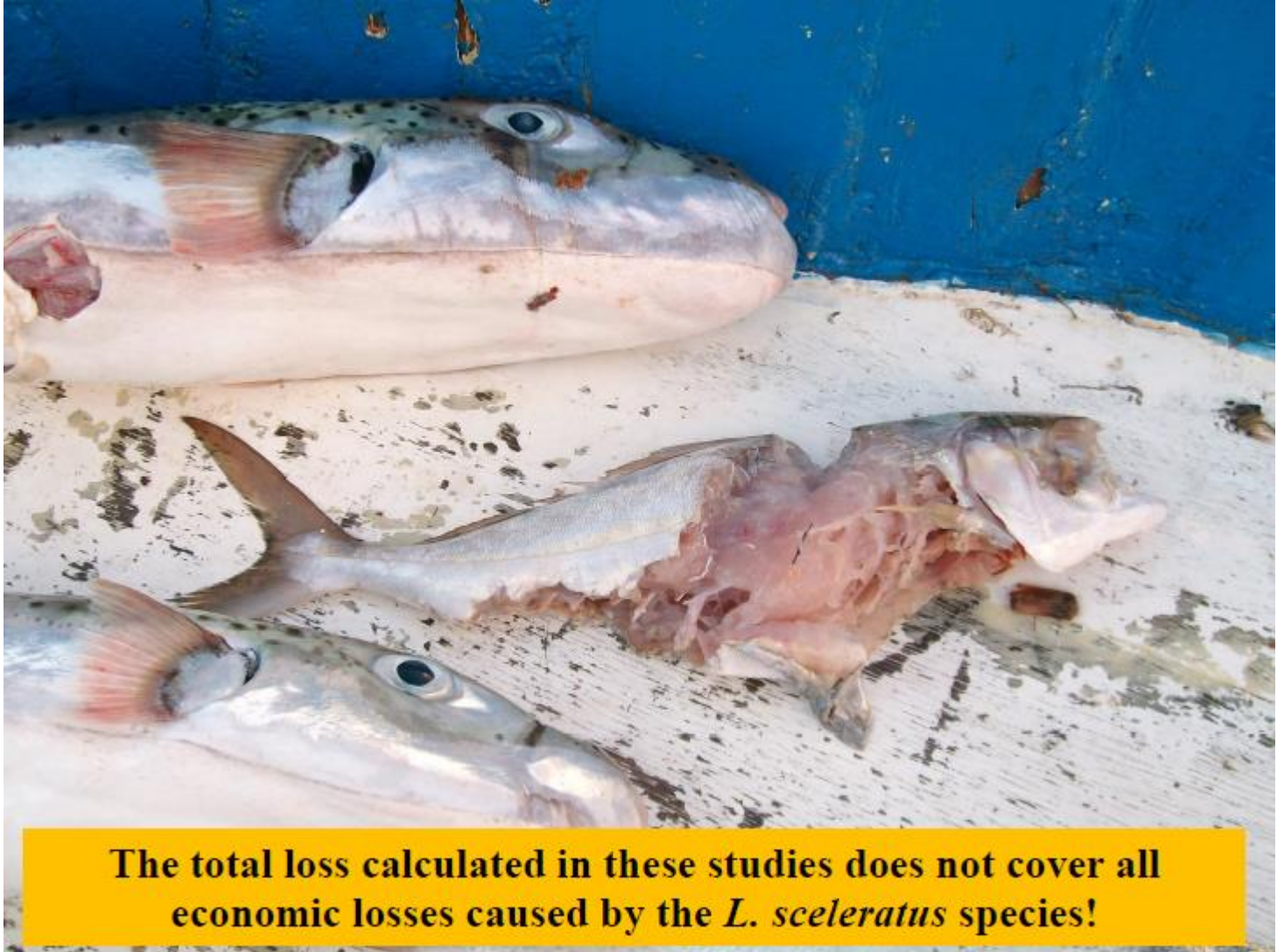
Introduction

Suez Canal

The worst of the 100 worst species

- Highly toxic
- One of the fastest expanding invasive
- Damages fishing gears
- Attack fishers' capture in the nets and the lines
- Causes extra work for fishers
- Predator for almost for all species

In fact, we do not know the real loss!



The total loss calculated in these studies does not cover all economic losses caused by the *L. sceleratus* species!

Any benefits from pufferfish?

Ways to benefit from pufferfish: Potential aquarium use

L. sceleratus has commercial value for aquaria purposes worldwide (Corsini-Foka et al. 2014) .



Juvenile specimens of *Lagocephalus sceleratus* in aquarium

(Total length 15-18 cm) (Corsini-Foka, et al., 2014)

Lessons learnt from pufferfish!

Table 1. Food poisonings due to animal natural toxins (Total score of 2002–2006, Ministry of Health, Labour and Welfare).

Causative food	Causative toxin	Number of incident	Number of patient	Number of death
Pufferfish of Tetraodontidae	Tetrodotoxin	166	223	13

Arakawa et al. *Kosho Eisei*, 73(5), 323–326, 2009. Table 1. © IGAKU-SHOIN Ltd.




Food Control

Available online 5 April 2018

In Press, Accepted Manuscript — Note to users

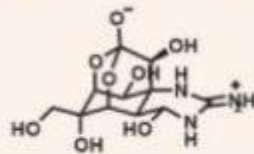


Toxic invasive pufferfish (Tetraodontidae family) along Italian coasts: Assessment of an emerging public health risk

Guardone Lisa^a,  · 1, , Gasperetti Laura^b, Maneschi Andrea^a, Ricci Enrica^b, Susini Francesca^b, Guidi Alessandra^a, Armani Andrea^a

Pharmaceutical-medical use of pufferfish!?

Pharmaceutical-medical use of pufferfish may be only solution to turn the situ into opportunity !



TTX

tetrodotoxin



- We could not use TTX for medical and pharmaceutical purposes!
- Could we use the skin?
- Could we use the teeth?
- Have we been able to get any benefit from this fish?
- ...

It has been 17 years since it entered our waters!

- We could not derive any economic benefit from the pufferfish yet.
- Even worse, we could not adequately monitor and compensate for the damages it caused.



Now! We have a new guest!

- First record in the Med. in Haifa in 1991 (Golani and Sonin, 1992)

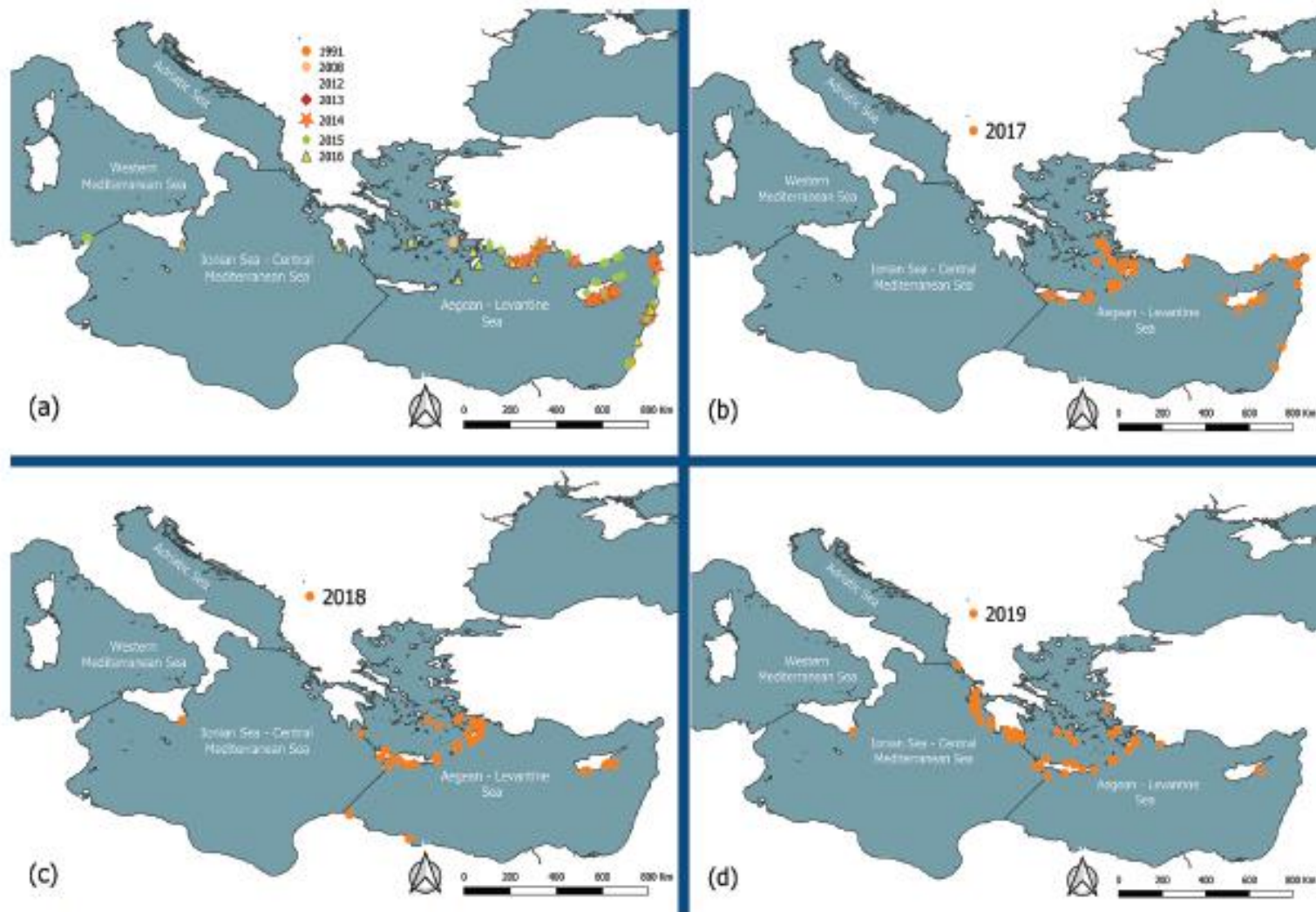


Fig 2: Reporting of *Pterois miles* in the Mediterranean Sea (a) from 1991 to 2016 (the year of first record in selected locations is depicted in the map); (b) in 2017, (c) in 2018 and (d) in 2019 (up to October 2019). MSFD marine subregions are also delineated (Jensen *et al.*, 2017).

SHORT COMMUNICATION

First record of the Indo-Pacific lionfish *Pterois miles* (Bennett, 1828) (Osteichthyes: Scorpaenidae) for the Turkish marine waters

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Abstract

A first record of the lionfish *Pterois miles* (Bennett, 1828) is reported for the Turkish marine waters, observed in Iskenderun Bay, Northeastern Mediterranean on 13 April 2014. The lionfish is the first non-native marine fishes, established in the family Scorpaenidae for the Turkish marine waters.

Keywords: Lessepsian species, lionfish, *Pterois miles*, first record, Turkish marine waters

With the lessons we learned from the pufferfish, we can make the following suggestions to create economic benefit from lion fish!

- There is no time to waste! Time to take action!

- An emergency action plan/
national management plan
- Increasing awareness
- The market-oriented solution



Credit: Maria Papinikola

- Using lessons learned from the Caribbean invasion!

PADI INVASIVE LIONFISH TRACKER SPECIALTY COURSE



"Spear Lionfish and eat them"

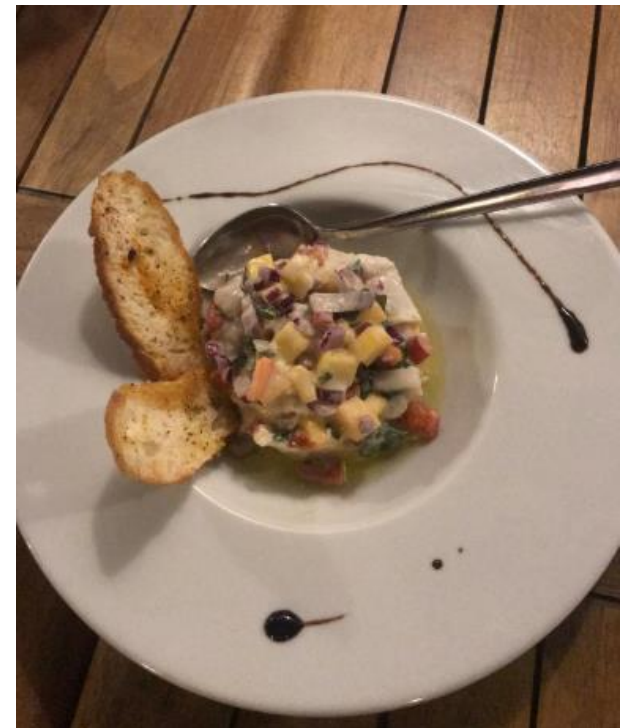
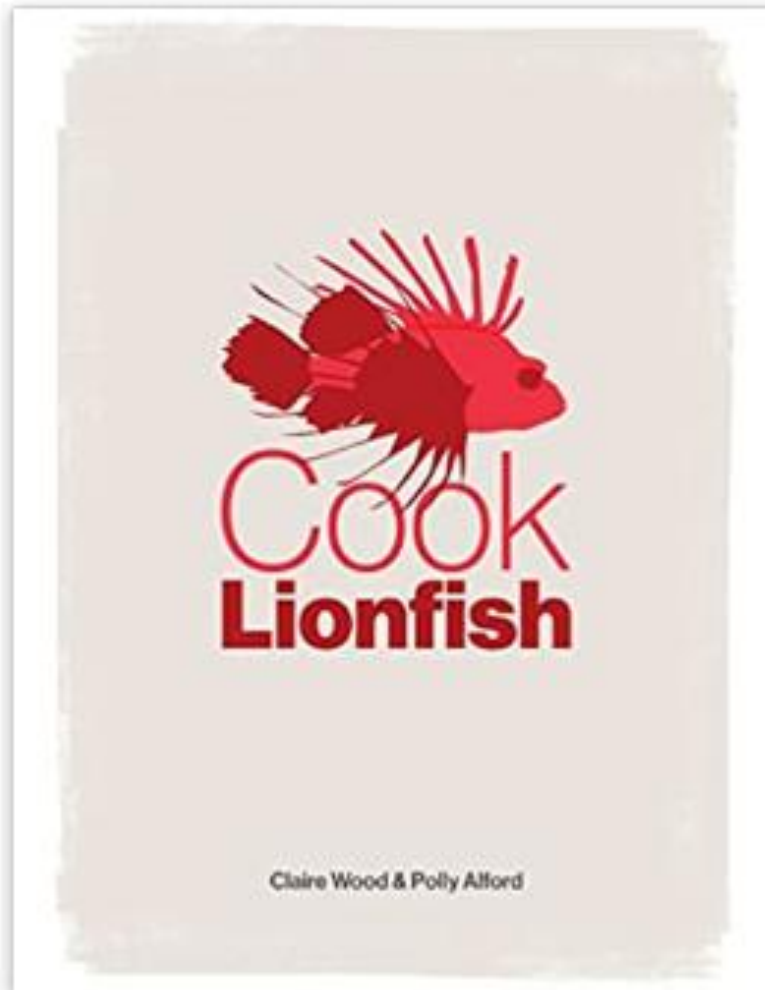


- USA- In 2010 the National Oceanic and Atmospheric Administration (NOAA) launched an **Eat Lionfish Campaign** to bring together fishing communities, wholesalers, and chefs to broaden U.S. consumer awareness of the invasive fish (NOAA 2010).



Cook Lionfish Paperback

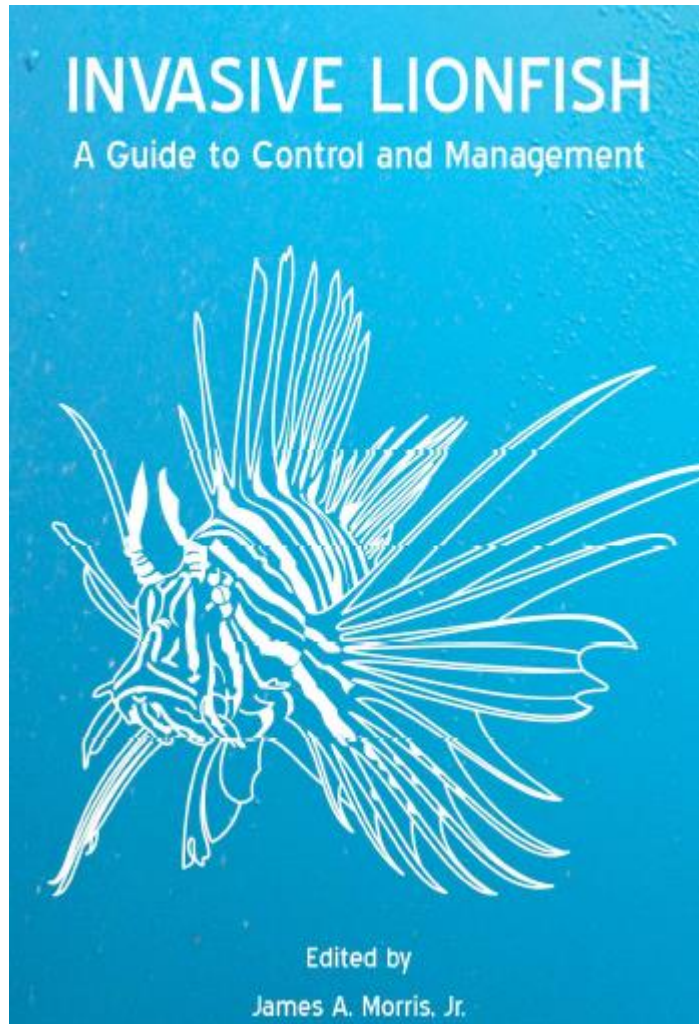
by Polly Alford (Author), Claire Wood (Author)







We are lucky! We can also benefit from the guidance of experienced researchers from other countries!



INVASIVE LIONFISH: A Guide to Control and Management



Editor
James A. Morris, Jr.
National Oceanic and Atmospheric Administration