

Invasive Species: Lionfish Management in México.

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MEDIO AMBIENTE
SECRETARÍA DE MEDIO AMBIENTE Y RECURSOS NATURALES



CONANP
COMISIÓN NACIONAL DE ÁREAS
NATURALES PROTEGIDAS

Invasive species

Among the most important threats to biodiversity conservation are biological invasions (McNelly 2001; Molnar et al, 2008)

The lion fish *Pterois volitans* (Linnaeus, 1758) y *P. miles* (J.W. Bennett, 1828) (Scorpaenidae) are native to the Indopacific (green) and arriving in Florida in 1992.



Habitat

Reefs, lagoons, estuaries, mangroves, seagrass meadows, springs and artificial substrates

They prefer rough, complex, large, and elevated structures from the sea floor.

Depth 0 up to 300 m

Tropical temperatures, resists up to 10 °C and low salinities.



FEEDING. Generalist carnivore



REPRODUCTION

- 30,000 eggs in each spawn, spawn in pairs, once a year and for four days

BEHAVIOR

Species distributed in the reef, solitary, non-pelagic, territorial, agonistic behavior and sexual dimorphism (Fishelson, 1975).

Fidelity to the site and they move less than 10 m. Tendency towards gregariousness. The juveniles are solitary. (Jud and Lynman, 2012)

Greater activity in twilight and evening, hours in which they feed, rest during the day with their heads down, hidden in holes or under ledges, activity is recorded all day. (Bouchon, 2010; Darling et al, 2011; Cote and Maljovik, 2010; Green et al 2011; Cure et al 2012).

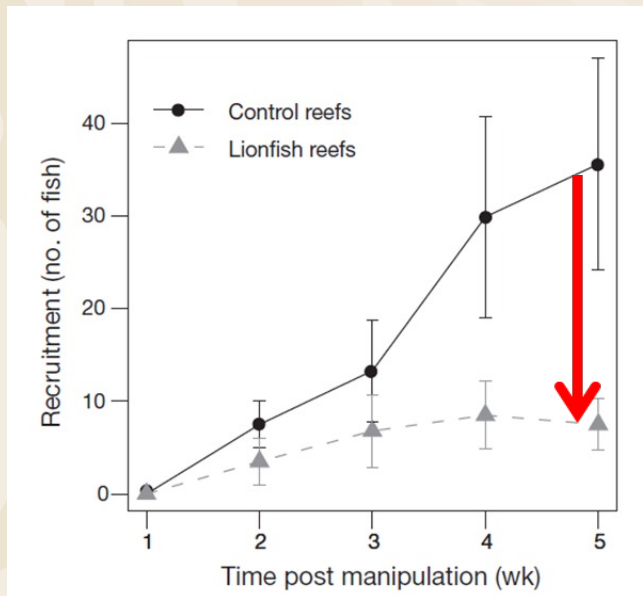


Ecological impact

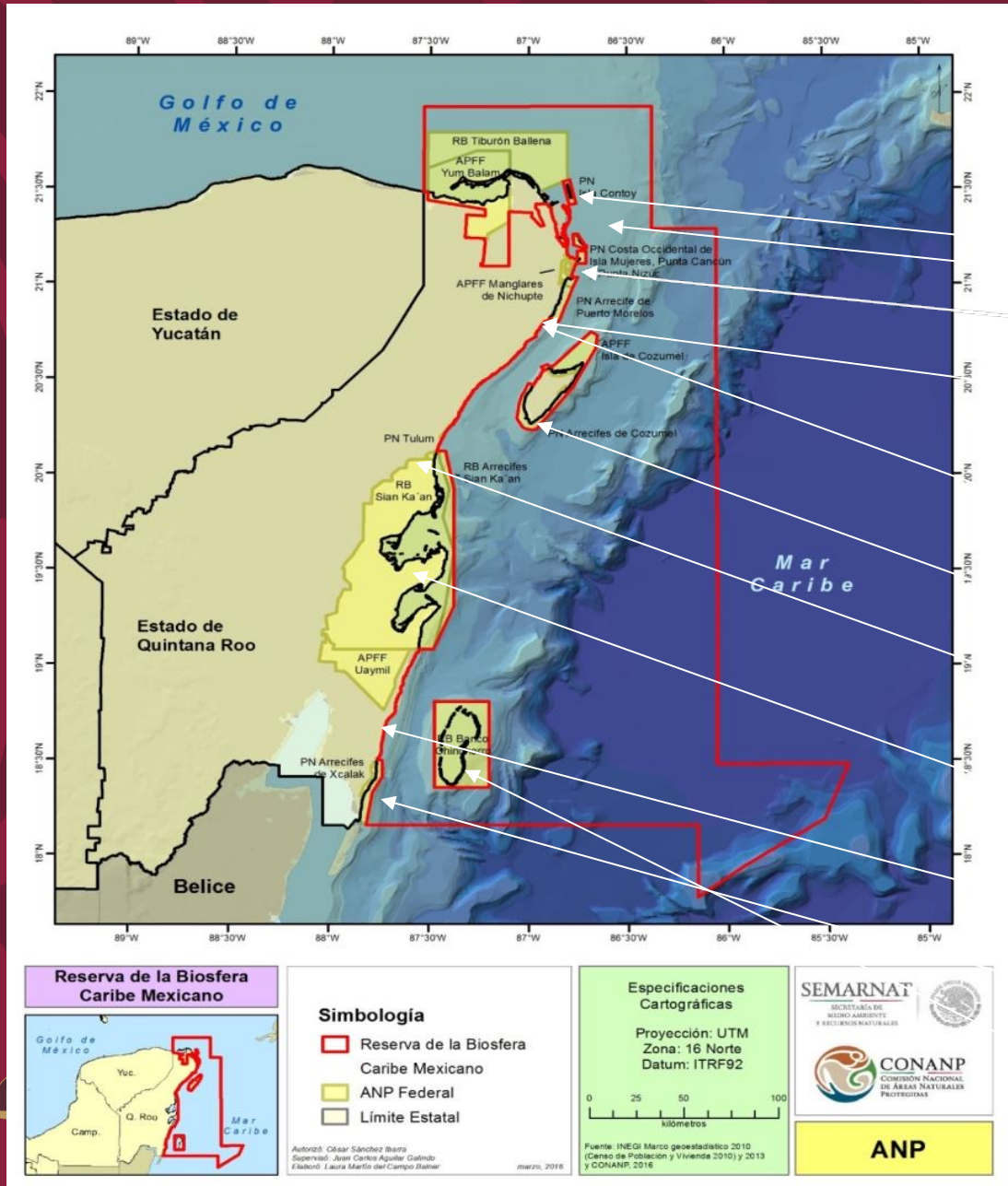
It reduces the recruitment of reef fish by up to 79% and 65% of the biomass of native fish (Albins and Hixon, 2008).

It consumes herbivores, producing algae dominance. (Lesser and Slattery, 2011)

When invasive species arrive, they strongly impact the ecosystem. They integrate after some time, reducing the intensity of the impact.

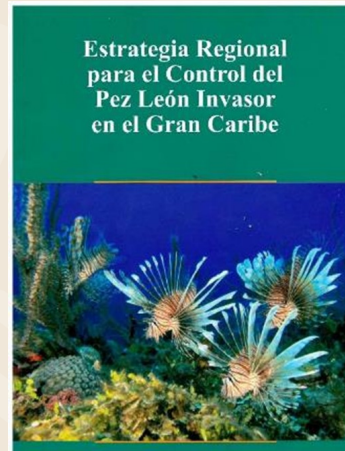
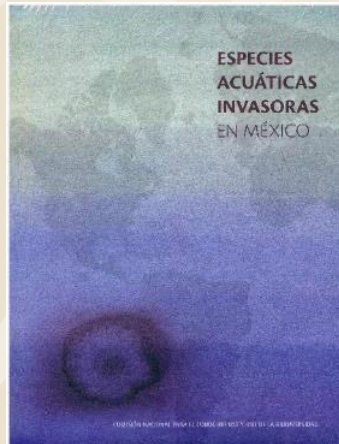


January 2010 Distribution confirmed in MPA



- Isla Contoy
- Isla Mujeres
- Cancún
- Puerto Morelos
- Playa del Carmen
- Cozumel (2009)
- Tulum
- Sian Ka'an
- Mahahual
- Xcalak
- Chinchorro

STRATEGY

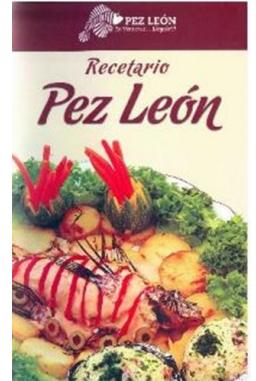


First sighting January 2009, Cozumel Island, Arrecifes de Cozumel National Park. Quintana Roo

First workshop to prepare an EARLY WARNING ACTION PLAN June 2009. REEF-NOAA

SPREAD THE WORD ABOUT THE PROBLEM

MASTER PLAN BASED ON ITS USE



1. COMMUNICATION
2. CAPTURE
3. MONITORING AND INVESTIGATION
4. LEGAL FRAMEWORK
5. BOOST MARKETING
6. INTERNATIONAL COLABORATION



COMMUNICATION

Key actors: Managers, researchers, government sector, fishermen, service providers, social organizations, environmentalists, researchers, tourists, divers, restaurateurs, residents, young people, schoolchildren, general public.

Resources: Talks, banners, signs, brochures, exhibitions, video capsules, spots, pages, events, fairs, conferences, books, articles.

Media: All



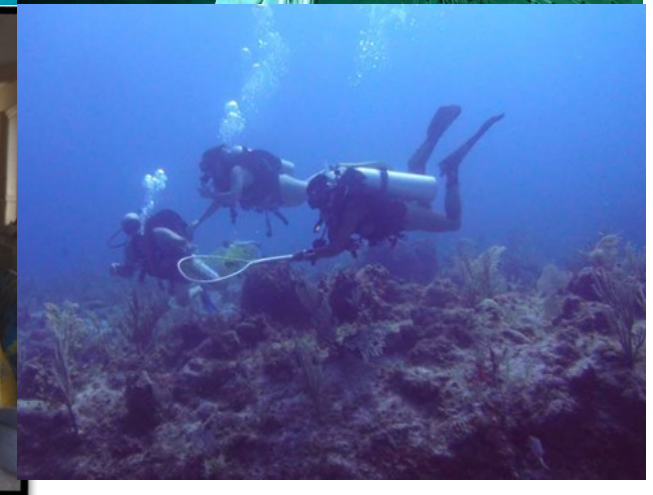
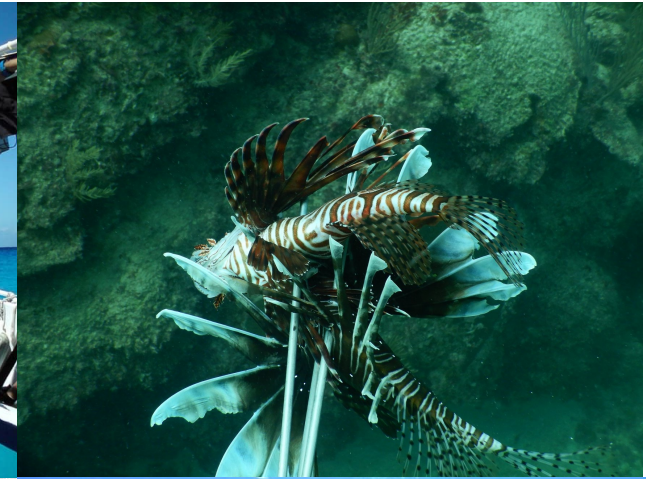
CAPTURE

Key actors: Fishermen, service providers, researchers, tourists, divers, young people, students.

Resources: Captures of organisms by handlers. Campaigns (free diving and SCUBA) fishing and tourism sector. Fishing tournaments. Courses aimed at capture (ecotourism) Commercial fishing (sale of meat and crafts) Exchanges of experiences.

Fishing gear: nets, harpoons, hawaiian nets, nets, containers, scissors, strings, bags.

Awareness, stimuli or incentives (recreation, payments and profits)



MONITORING AND INVESTIGATION



Monitoring by handlers (incorporate SAM-AGRRA into reef monitoring), approved technique.

Spread the word about the problem to research centers and facilitate studies.

Thematic forums and national and international exchange.

Promote funding from donors and federal programs.

Topics: Distribution and abundance (specific censuses and directed censuses), morphometry, feeding, genetics, effects on the reef community, parasites, behavior, ecological effects.

Identification of research needs

LEGAL FRAMEWORK



Authorization by CONAPESCA

- Agreements with Recreational Aquatic Service Providers.
- Agreements with Fishing Cooperative Societies, delimitation of areas.
- Facilitate authorizations for investigations (collection, handling and transfer)
- Agreements and changes in operating rules of subside programs: Temporary Employment Programs (PET) and Conservation Programs for Sustainable Development (PROCOCODES), Conservation Programs for Species at Risk.

BOOST MARKETING

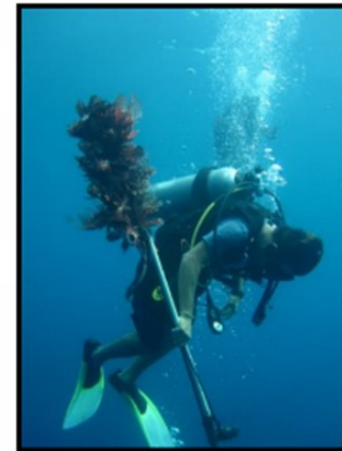


- Promote consumption, its meat is not poisonous
- Business plans, market studies.
- External Financing for capture and marketing.
- Identify buyers
- Facilitate import permits.
- Establishment of points of sale.
- Promote certifications and barcode
- Coordination between the fishing sector to establish prices, approve qualities, packaging and transportation techniques.
- Marketing of crafts.

FISHERIES

Fisheries of Fish lion in tree years (2011-2014)

Capture locality	organisms	filet tons	Sales Profit (USD)
Sian Kaan Biosphere Reserve	32311	5	\$ 81,250.00
Cozumel Reef National Park	25000	3.86	\$ 62,725.00
Puerto Morelos Reef National Park	64000	10	\$ 162,500.00



Lionfish Fin Crafts



Women of Xcalak (2011) Isla Mujeres
(2017)

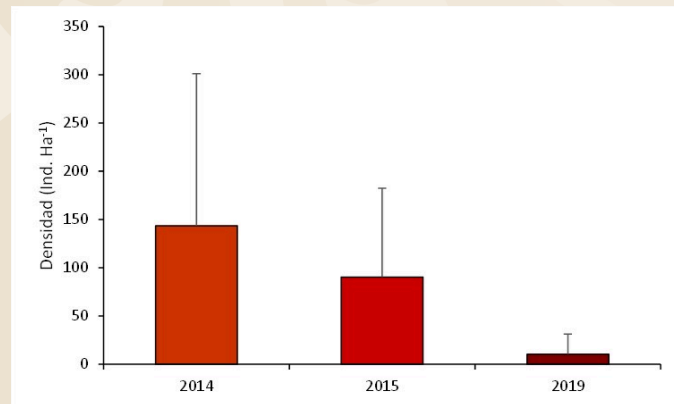


INTERNATIONAL COLLABORATION

- SAM regional workshop
- ICRI
- GCFI
- Thematic Forums
- Exchange of experiences between various actors
- Participation in networks
- Incorporate into the different international conventions and treaties



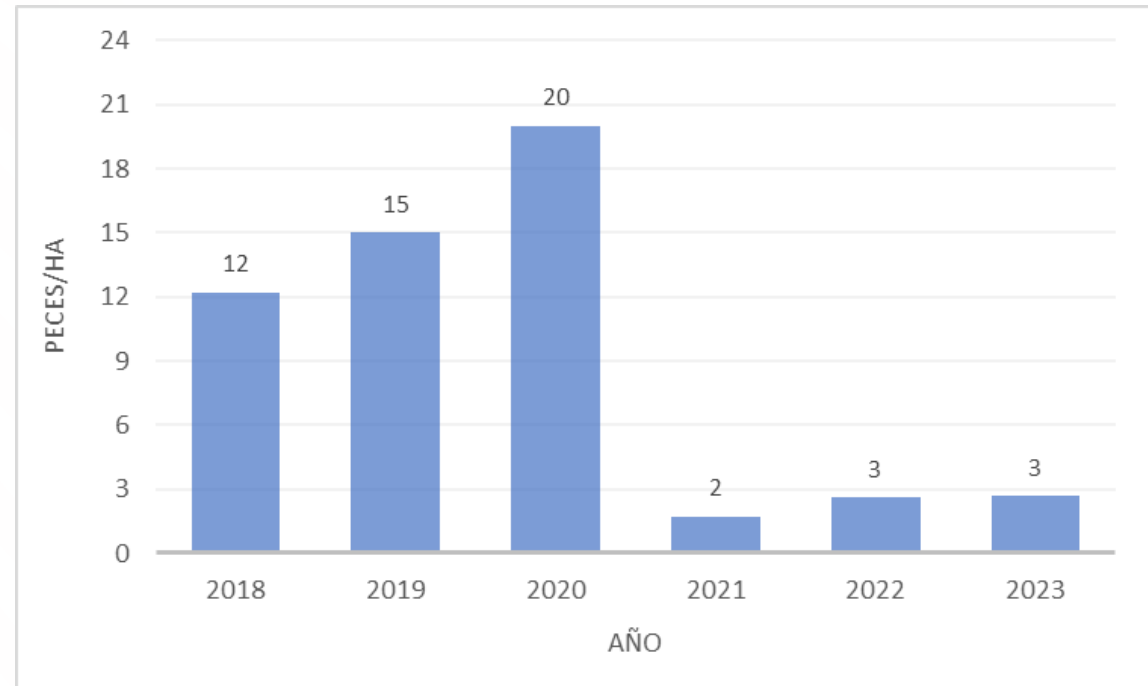
LION FISH DENSITY



XCALAK REEF NATIONAL PARK

Sabido., et al 2017

PUERTO MORELOS REEF NATIONAL PARK



Hernández, 2024.

ECOLOGICAL IMPACTS

Five-year effects were not evident on spiny lobster *Panulirus argus* production from the Banco Chinchorro Biosphere Reserve (Sosa-Cordero et al. 2014). The effect is not clear on the ichthyofauna of this site either, since the areas with the highest density of lionfish were impacted by Hurricane “Dean” two years before the arrival of the invader (Priego, 2014).



CONCLUSIONS

1. The lionfish is registered as an invasive species in Mexico
2. The early warning plan was developed in a timely manner and helped mitigate the threat
3. The success factors:
 - Identification of leader in the program with good representation
 - Immediate socialization to relevant actors and family level
 - Relevant legal framework
 - Possible and profitable solutions (circular economy)
 - Startup financing
 - Adaptive ecosystem
 - Continuity in the program

Let us never lose sight of the long-term objective: the lionfish are invaders, they cause an impact on the environment, the economy and public health.



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