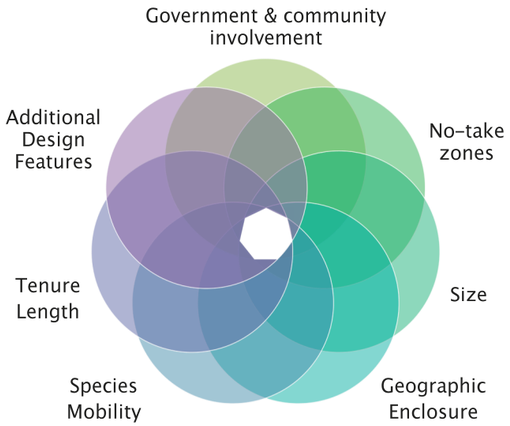
3 How can these findings be applied?

The findings of this research provide managers and stakeholders with a more comprehensive examination of where TURFs are located around the world, how they are designed, and which key design features contribute to their success. However, TURFs are highly complex, site-specific, and flexible, meaning there are many ways to achieve TURF success and no single combination of design features guarantees a TURF will meet its objectives.



No single combination of design features will guarantee TURF success (open center in diagram), but when design features are selected in combinations that best suit local conditions, success can be achieved.

Discussion and Recommendations

TURFs are a unique management strategy by virtue of their clear boundary and exclusive access. These features allow for innovative design characteristics and management strategies that are not feasible under other forms of fisheries management. This analysis offers valuable insight into key design features that should be considered in the development of a TURF.

However, TURF success can be achieved in many different ways, and does not necessarily rely on a cert-ain combination of key design features. Instead, TURF success relies on a collaboration of some key design features and a suite of additional design features that can be molded to fit the needs of local communities. We discovered TURFs that span a variety of income levels, cultures, habitats, species, etc., demonstrating the flexibility inherent in TURF design and management.

Photo credit: Linda Schonknecht/Marine Photobank

Takeaways

- Our study examined several key design features that are vital to consider when designing successful TURFs. There are also a number of additional design features identified (but not analyzed) that can contribute to a TURF's ability to meet its stated objectives.
- TURFs are successfully, and unsuccessfully, applied under an incredibly diverse set of conditions. There is clearly no one-size-fits-all management solution, but when key design features are supplemented by additional design features that address local needs, TURFs are a flexible, site-specific solution to problems facing small-scale fisheries around the world.

References and Acknowledgements

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Pictured: Alana Yurkanin, Gina Auriemma, Dr. Chris Costello, Kristen Byler, Katie Peterson

References: [1] *[Wilen, J. E., Cancino, J., & Uchida, H. (2012). Applicability of Individual Transferable Quotas (ITQs) in Japanese Fisheries: A comparison of rights-based fisheries management in Iceland, Japan, & the United States. Marine Policy, 36(1), 241-245.;* [2] *Christy, F. T. Jr., (1982). Territorial use rights in marine fisheries: definitions and conditions. FAO Fish. Tech. Pap., 227.;* [3] *Ostrom, E. (1990). Governing the commons: The evolution of institutions for collective action. Cambridge: Cambridge University Press.;* [4] *Bonzon, K., McIlwain, K., Strauss, C.K. and Van Leuvan, T. (2010). Catch Share Design Manual: A Guide for Managers and Fishermen. Environmental Defense Fund.*

DiscoverTURFs

A global assessment of Territorial Use Rights in Fisheries to determine variability in success and design

Project Members
Gina Auriemma
Kristen Byler
Katie Peterson
Alana Yurkanin

Faculty Advisor
Dr. Chris Costello

MESM Group Project Brief **Spring 2014**

Photo credit: Stacey Jupiter/Marine Photobank

Overview

Over one third of all assessed global fisheries are overexploited, despite extensive management strategies aimed at reducing overfishing. Territorial Use Rights in Fisheries (TURFs) are a widely implemented management strategy that gives individuals or communities exclusive access to marine resources within a specific area. This strategy is capable of providing fishers with incentives to harvest sustainably. Although numerous aspects of TURF management and design are hypothesized to lead to success, it is still unclear which strategies are capable of achieving management objectives. Utilizing survey responses and published literature, we conducted the first global analysis identifying where TURFs are located, how they are designed, and which factors contribute to their success.

Project Scope

1 How are TURFs designed and what influences TURF success?
Document key design features and analyze which influence a TURF's ability to meet self-defined objectives.

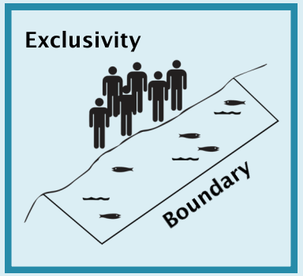
2 Where are TURFs located?
Generate the first comprehensive database and map of TURFs around the world.

3 How can these findings be applied? Conclusions and recommendations for Fish Forever's global initiatives.

Significance

This project contributes to areas of TURF research that are relatively unexplored on a global scale. The results of this project will be a significant contribution to Fish Forever - a partnership between Rare, the UCSB Sustainable Fisheries Group, and the Environmental Defense Fund to implement TURFs around the world.

What is a TURF?



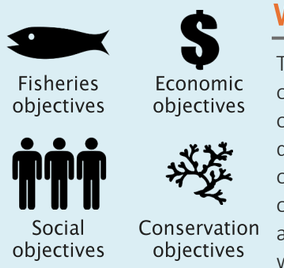
For the purpose of this analysis, a TURF is:

*A marine area in which **individuals or communities** are given some level of **exclusive access** to marine resources within a clearly **defined boundary.***

Territorial Use Rights in Fisheries (TURFs) give individuals or communities exclusive access to marine resources within a specific area. Although design features vary greatly across TURFs, all TURFs strive to engage and empower local communities while incentivizing users to fish responsibly. TURFs can facilitate the recovery of overexploited fisheries while managing the environment for long-term sustainability [1]. While many researchers have offered loose definitions for a TURF [2], there is no single agreed-upon definition available, which influences our ability to understand success in TURFs.

1 How are TURFs designed and what influences TURF success?

There are many assumptions and opinions about which management strategies are essential for a TURF's success. Yet, few studies have explicitly tested these assumptions, leaving resource managers with an unclear understanding of what makes a TURF effective. Many overarching assumptions are thought to lead to ecologically, economically, and/or socially successful TURFs, but do not necessarily lead to effective, holistic management [3, 4]. Assessments of TURF success can be additionally complex depending on how success is defined and measured. Overall, determining whether a TURF is successful is inherently dependent on the objectives associated with a particular TURF.



What is success?

The success of a TURF can be measured in many different ways, depending on what objectives the TURF is trying to meet. We identified four categories of management objectives: fisheries, economic, social, and conservation. For example, some TURFs are designed to increase the number of fish caught (fisheries objective), while others focus on conserving a particular species (conservation objective). Often, these management objectives overlap with one another. Our study defined success in terms of a TURF's ability to meet its stated and self-ranked management objectives. With this definition, we tested six of the common assumptions believed to be associated with TURF success.

TURF design characteristics

No-take Zones

- No-take zones (NTZs) are marine areas where removing resources is prohibited, providing an area where species are protected.
- Coupling TURFs and NTZs is thought to benefit TURFs, as fish size and abundance increase inside and around reserves.
- No relationship detected between presence of NTZ and TURF success.

Government & Community Involvement

- Co-management is where community and government involvement in TURF management are approximately equal.
- Co-management allows collaboration between local knowledge and government capacity and is often linked to TURF success.
- Co-management significantly related to TURF success.*

Species Mobility

- The amount an individual moves within an area varies by species (e.g. most sharks are highly mobile whereas clams are not).
- TURFs may be more successful when targeting lower mobility species as it is easier to manage a species that stays within the TURF.
- Targeting low mobility species significantly related to TURF success.*

Size

- TURF size varies considerably around the world and hypotheses differ regarding impacts of size on success.
- Larger TURFs can be difficult to enforce, impeding TURF success. However, if target species are highly mobile and move outside boundaries, increasing size may improve success.
- No relationship detected between size and TURF success.

Geographic Enclosure

- Some TURFs are enclosed within a geographic feature such as a bay or lagoon, while TURFs along an open coastline or offshore are not enclosed.
- TURFs not confined by land may have less defined and defensible boundaries, making monitoring and enforcement more difficult.
- Geographically enclosed TURFs significantly related to TURF success.*

Tenure Length

- Duration of tenure measures the length of time a fisher has the right to harvest resources within a TURF (e.g., 1 year, perpetuity, etc.).
- TURFs that assign harvest rights for longer periods of time incentivize fishers to steward resources for the long-term.
- Longer tenure length significantly related to TURF success.*

* Statistically significant based on regression analyses

Methods for data collection and processing

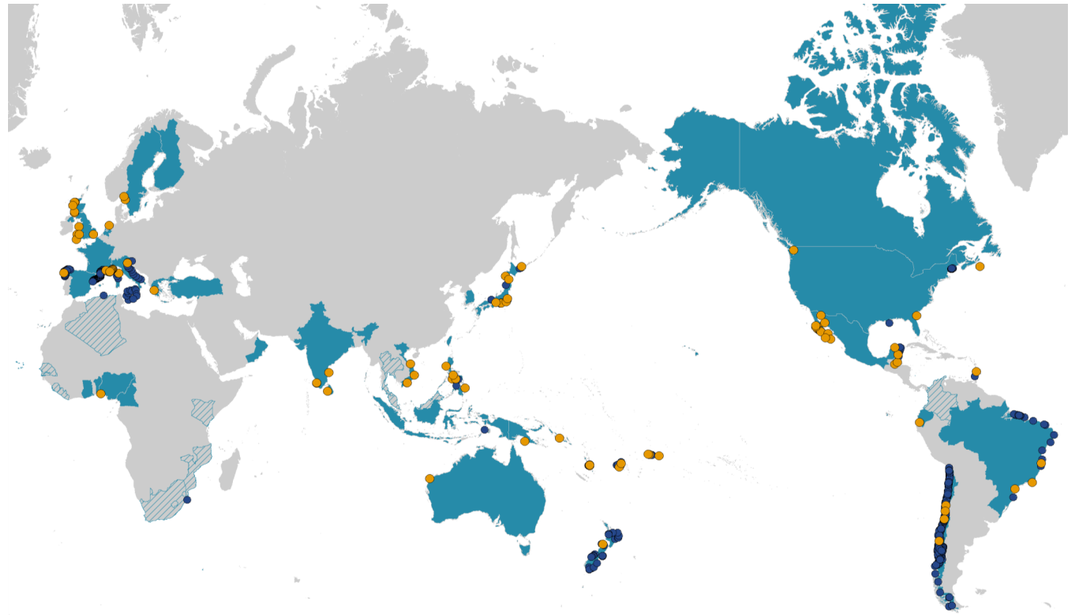
Survey — We collected data at varying levels of resolution, from site-specific to general management trends at the country level. First we created and widely distributed a survey on an online platform, SeaSketch, targeting academics, non-profits, and government officials with first-person knowledge on TURFs.

Literature Review — We used available databases and the literature for examples of TURF management, recording locations and areal extents where possible.

Analysis — To analyze our data, we used regression analyses to explore relationships between TURF success and key design characteristics, as well as relationships between the design characteristics themselves.

2 Where are TURFs located?

To implement TURFs effectively around the world, it is critical to identify not only how they operate, but also where they operate. Our research documented the locations of 1,133 TURFs in 41 countries.



Countries with TURFs (n=41)

We identified TURFs in 41 countries, creating the most comprehensive map of TURFs around the world.

Case study TURFs (n = 103)

We gathered in-depth information for 103 individual TURFs in 29 distinct countries. We used the data from these case studies in our analysis of TURF success.

Countries with interest in TURFs

We found 11 countries that do not currently have TURFs, but have expressed interest in them and are in the process of developing a TURF management strategy.

TURF locations (n = 1,133)

We identified 1,133 individual TURFs for which only location information was obtained. We acknowledge that many more TURFs exist that we were unable to locate.

Countries with no data

While TURFs may exist in these countries, we were unable to confirm their presence or absence. Further research may reveal additional countries with TURFs.