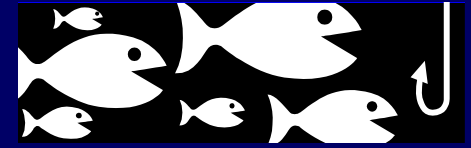


Benefits of Marine Reserves as a Fisheries Management Tool

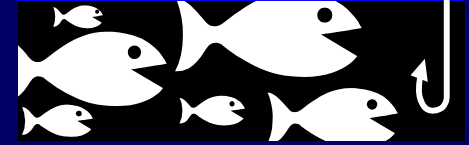


Melanie McField, Ph.D.
World Wildlife Fund



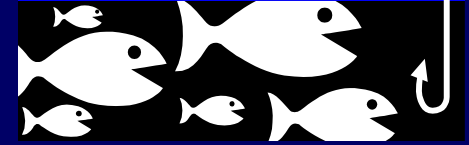
Why do we need marine reserves?

- Global fisheries and ecological crisis
- Traditional fisheries management has failed & only considers a few species
- <1% global ocean is in MPAs
- <0.0001% is fully-protected
- Fisherman now work harder and spend more money to catch less fish



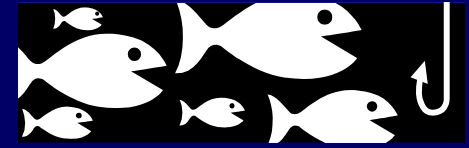
Objectives of marine reserves

- Conservation, ecosystem functioning, research, tourism
- Support sustainable fisheries
 1. Maintain or increase exploited populations
 2. Increase or maintain fishers catches
 3. Increase long-term viability of industry
 4. Simplify multi-species management



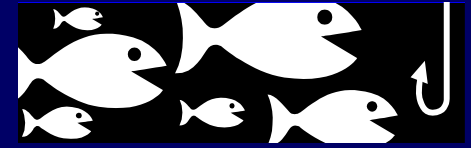
Fully protected reserves are:

- Closed to all forms of fishing
- Closed to extractive activities (dredging)
- Closed to dumping
- Open to well-managed, non-consumptive activities like diving and wildlife viewing
- Open to scientific research



Potential fisheries benefits of reserves

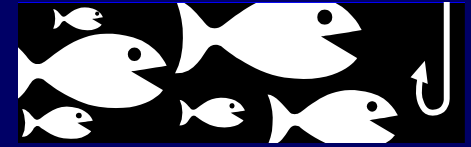
- $> \text{spawning stock biomass} = > \text{replenishment} (> \text{fish})$
- Spillover enhances local catches
- Offers insurance against uncertainty
- Increased predictability of catches
- Reduced problems with multi-species mgt
- Easier enforcement
- Greater equity among fishers
- Greater public understanding of management



Evidence for increased biomass

- Recent study compiled publications from 76 reserves (variable protection/enforcement)
- Avg. abundance doubled
- Avg. biomass 2.5 times higher
- Avg. size 33% higher (which equals 240% higher reproductive output!)

Irrefutable evidence that protecting areas from fishing leads to a rapid increase in biomass, abundance and average size

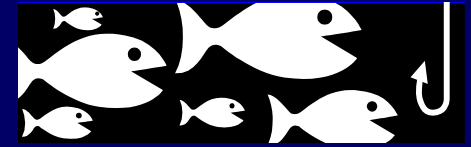


Hol Chan Marine Reserve

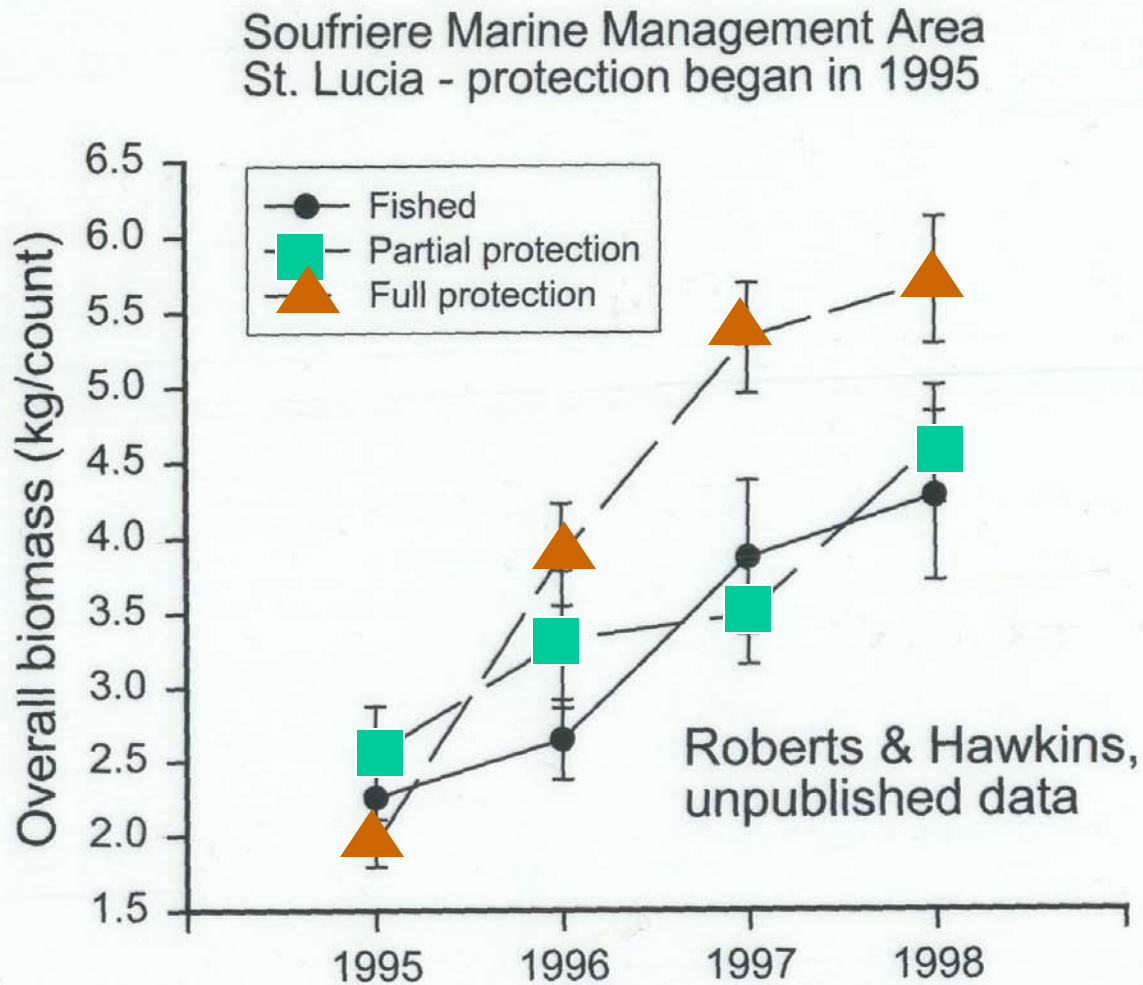
Hol Chan is has served as an international case study
Within 4 yrs of protection recorded higher densities
of large fish than any coral reef in the world
Predatory families (groupers, snappers and grunts)
having greater biomass in HCMR vs 3 other cuts
(no baseline – time series data available)

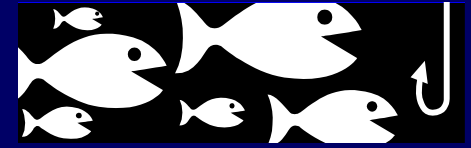
Lobster 15 times higher:
30 lobster/hr HCMR
1.6 lobster/hr Mex rocks
2.4 lobster/hr Basil Jones

Conch 8.3 times higher:
33 conch/km² HCMR
42% are mature (reef flat)
4 conch/km² Mex Rocks
14% are mature (reef flat)



Reserve performance in the Caribbean



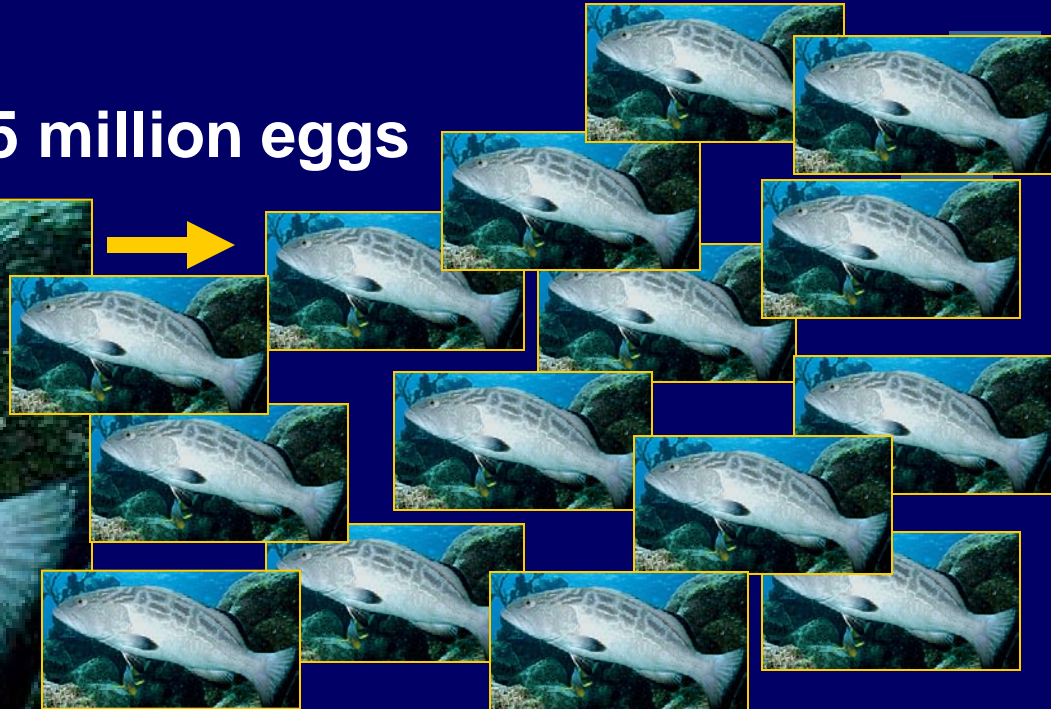


SIZE DOES MATTER!



40cm grouper produces 1 million eggs

100cm grouper produces 15 million eggs






Where do the recruits end up?



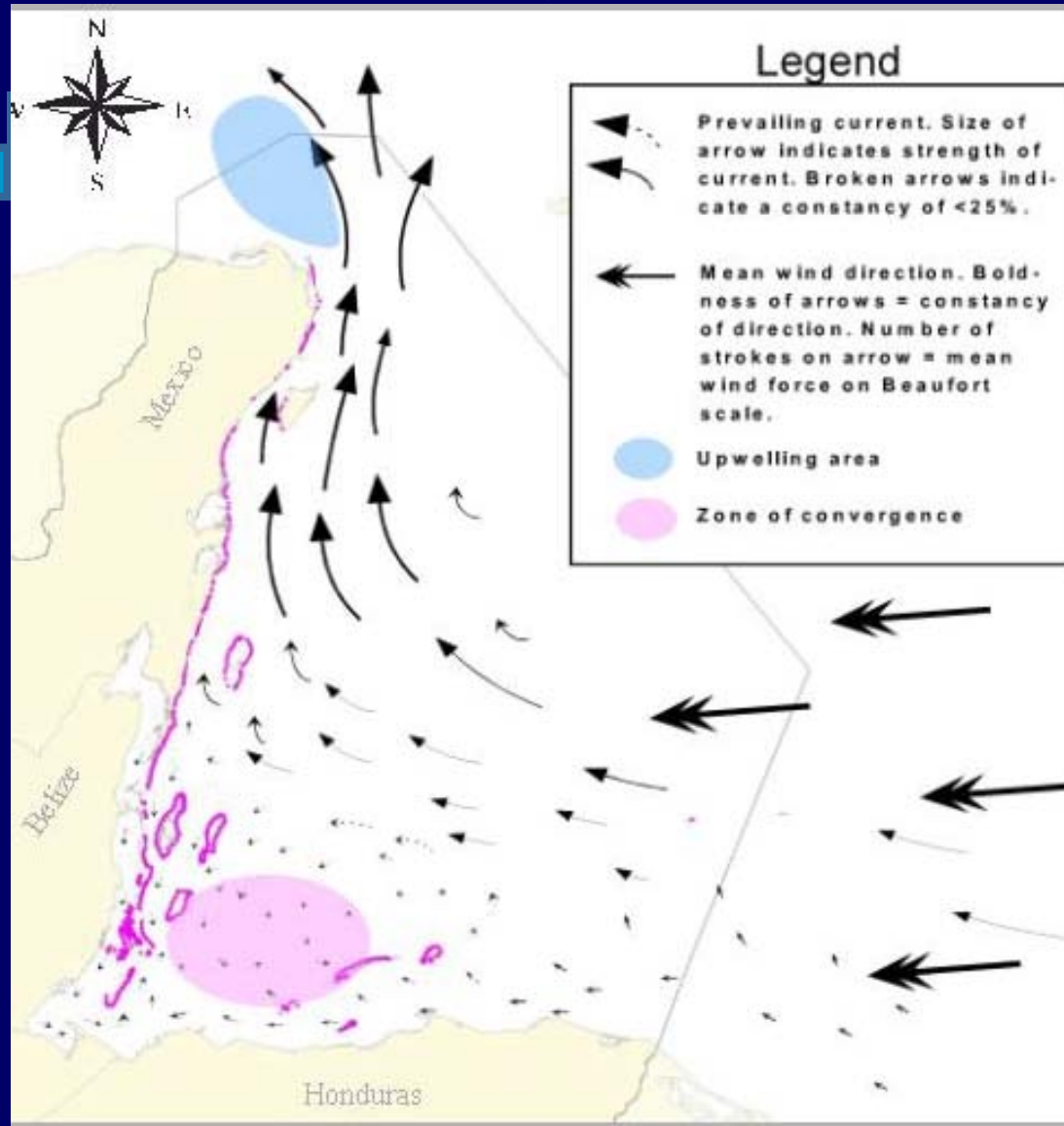
Depends on larval cycle
Larval motility and preference
Current patterns and speeds



Network of regional MPAs is needed to ensure maximum
Benefit, particularly for long-ranging species like lobster.

Complex current patterns, counter-currents, and
tidal flux across reefs help to keep recruits near home

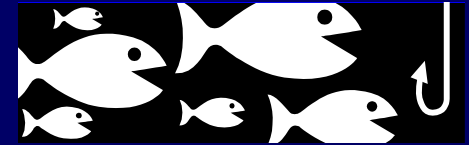
Connectivity via currents





Evidence for spillover:

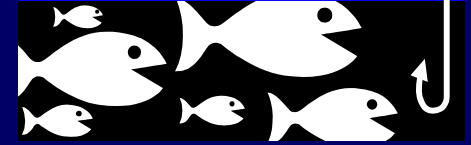
- Tagging studies show many fish species move enough for some to leave reserves
- Catch per unit effort of fishers has increased close to reserve boundaries
- In well-established reserves fishers have learned to “fish the line”
- Little data collected in Belize, although fishers report increases near Hol Chan and Port Honduras



Evidence for conservation benefits

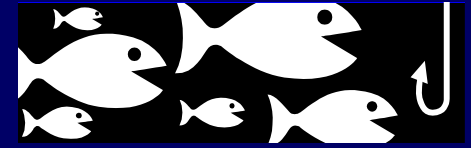
- Reserves around the world have led to increased species diversity
- Reserves lead to increased habitat structural complexity
- Reserves support species unable to persist in fishing grounds
- Reserves increase community awareness, participation in and support for conservation measures (local development controls, etc)

Healthy reefs produce more fish & are more resilient



How long does it take to produce benefits?

- In well-respected reserves, stocks of many exploited species increase by ~2 to 4 times in 5 years; some even more
- Spill-over should become significant within 5 years
- Net gains will come faster the more overfished stocks are to begin with



How much should be protected?

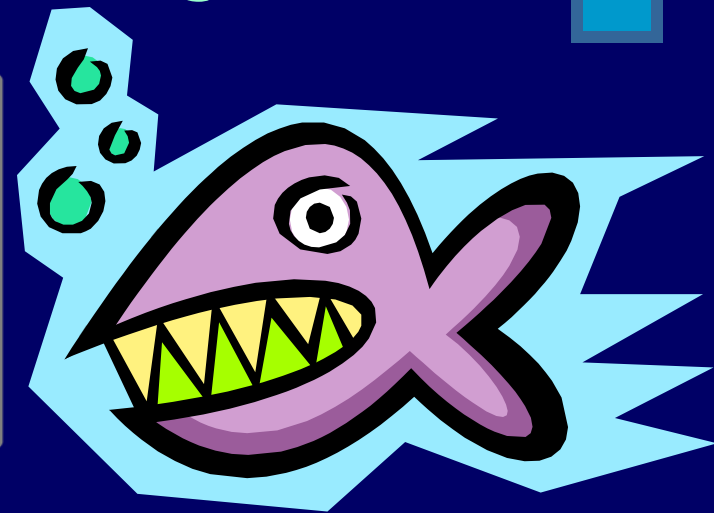
25-50% should be “fully protected” in order to ensure sustainable fisheries

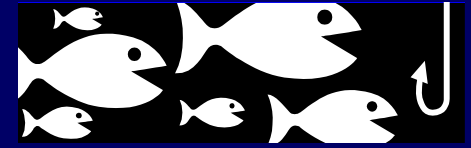
How close are we to this goal?

1% fully protected !!!!!!

....come on

“I’d give ya an E for Effort-needed”





Current Situation in Belize

13% of Belize's territorial waters are within MPAs

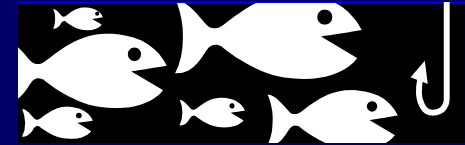
But only about 8% of the MPAs are "fully protected"

< 1% of our territorial waters are "fully protected"

4% of reef and seagrass habitat is "fully protected"

Also "effective" no-fishing zone below free diving limits (~ 80') which mainly assists conch and lobster

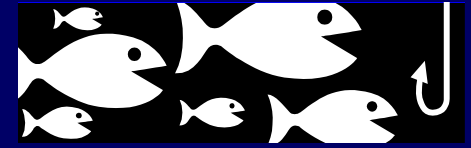
This has likely helped to prevent dramatic declines in catches that have occurred in other countries where there is fishing with SCUBA



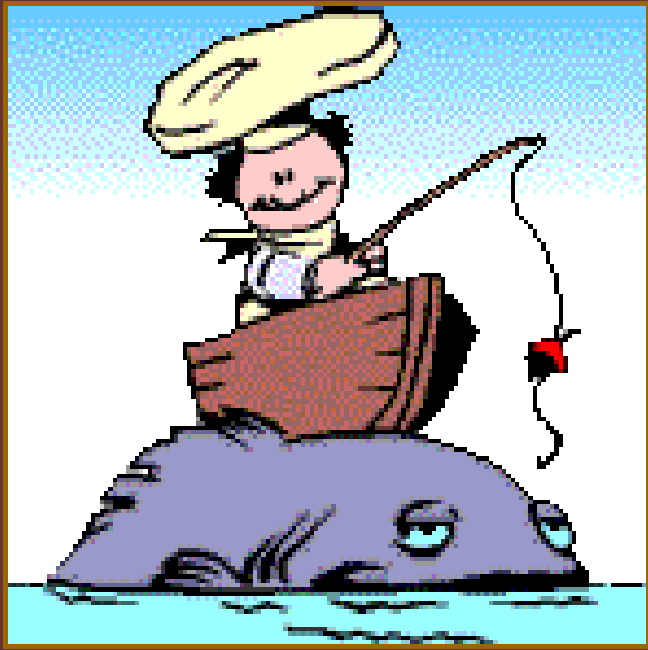
Summary

- Marine life and fisheries depend on healthy ecosystems
- Marine reserves can be powerful tools to support fisheries (and conservation, tourism, community development, etc)
- These multiple benefits are compatible
- Marine reserves can help YOU better manage your marine resources

It's a WIN – WIN situation !

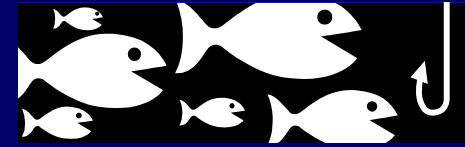


We are currently under-invested in reserves

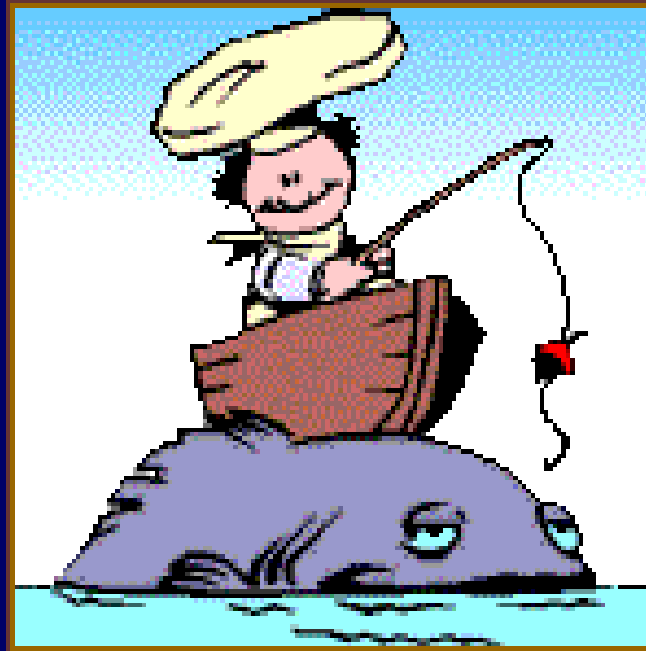


More big fish in reserves
Means more fish available
to fishermen, who can
catch more fish in a
smaller area

*Famous Catch 22: "it takes money to make money"
it also "takes fish to catch fish"*



Thank You!



It just makes cent\$...investing in marine reserves is like putting money in the bank and living comfortably on the interest. It ensures self-seeding, productive fisheries for the long-term future.