OHI documentation

**Wild Caught Fisheries**

Data layers used

Commercial catch data (2012-2016)

Non-commercial catch data (used as a multiplier for commercial catch data)

Stock assessment from pelagic, bottom fish, and reef fish. Stock assessments did not over-lap with the most recent catch data. The most recent stock assessments were 2012-2013 for most species. I used the last ten years of stock assessment data to run a linear regression model to predict stock status to 2016. If stock status was non-linear then the ten year mean stock status was used. The stock indicator for pelagic species was SB/Sbmsy. Bottom fish stock assessment was for the aggregated species complex for the Hawaiʻi deep 7 and used B/Bmsy as the stock indicator. Reef fish stock assessment used the spawning potential ratio (SPR) as the stock indicator the reef fish spawning stock was compared to the Northwest Hawaiian Islands and the stock assessment is not reported by year so the stock status was held constant over the 5 assessment years. Used median scores for each group (pelagic, bottom, and reef to gap fill for species that lack formal stock assessments.

**Mariculture**

Mariculture is measures as the local production/harvest of seafood for consumption and the production potential from local fishponds known as loko ia.

Commercial mariculture production is a small fraction of the total seafood production potential of fishponds in Hawaii and thus represents a small percentage of the overall mariculture score. ADD section on importance of fishponds here.

However the value of aquaculture products ($39,970,000 in 2011 USD) natural products and seafood is ranked 4th in the state following seed crops, flowers and nursery products, and cattle (USDA Annual Statistics Bulletin 2011). Revenue from mariculture is incorporated into Livelihoods and Economies.

The species that are produced locally for seafood consumption include:

Abalone (*Haliotus sp)*, oysters (*Crassostrea gigas* and *Crassostrea sikamea*), clams (*Venerupis philippinarum*), kahala (*Seriola dumerili*), Pacific White Shrimp (*Penaeus vannamei*), and limu (Gracilaria sp.). Moi (Pacific Threadfin) is not on the State of Hawaii Department of Agriculture list but it is produced locally for out planting in fishponds. The sustainability of the species produced was assessed as the average of the feed sustainability score (0 protein based, 1 plant based; 0 imported feed, 1 local feed) and the biosecurity risk scored as species status (1 native, 0.75 introduced, or 0 invasive) and the pathogen and virus susceptibility (0 highly susceptible, 0.5 susceptible but preventative measures in place (biosecurity practices such as sterilization and wastewater treatment practices).

The production (lbs of seafood) is reported at the state level to prevent disclosure of sensitive information. To get county level estimates of production the lbs of finfish and shellfish produced at the state level were multiplied by the estimated number of finfish and shellfish operators by county. The number of operators are reported to USDA via census every 5 years (2002, 2007, 2012) ([https://www.nass.usda.gov/Statistics\_by\_State/Hawaii/](https://www.nass.usda.gov/Statistics_by_State/Hawaii/Publications/Annual_Statistical_Bulletin/index.php) ). To fill in annual data gaps linear regression models were used.

Reference is temporal maximum harvest?

What would completely sustainable mariculture look like for what we can control – local and sustainable feed production, native species or biosecurity threat. Maximum score when risk is alleviated (risk = 1) and (NELHA as best?)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Cultured Species | Species Name | Sustainable Feed (0=imported) | Feed Plant Based (0=protein based) | Susceptibility to Disease (0=highly susceptible) | Native (1), Introduced (0.5), Invasive (0) | Sustainability Score |
| Abalone | *Haliotus refens, Haliotus discus hanai* | 1 | 1 | 1 | 0.5 | 0.88 |
| Broodstock and juvenile shrimp | *Litopenaeus. vanamei, L. monodon, L. stylirostris* | 0 | 0 | 0 | 0.5 | 0.13 |
| Kahala (amberjack) | *Seriola dumerili* | 0 | 0 | 1 | 1 | 0.50 |
| Marine ornamentals fish and plants | *Various species* | 0.5 | 0.5 | 1 | 0.5 | 0.63 |
| Marine shrimp for food | *Penaeus vannamei* | 0 | 0 | 0 | 0.5 | 0.13 |
| Microalgae | *Spirulina sp, Hematococcus sp* | 1 | 1 | 1 | 1 | 1.00 |
| Seahorses (various species) | *Hippocampus sp* | 0.5 | 0 | 1 | 1 | 0.63 |
| Seaweed or sea vegetables | *Gracilaria sp* | 1 | 1 | 1 | 0.5 | 0.88 |
| Seed clams | *Mercenaria mercenaria* | 1 | 1 | 1 | 0.5 | 0.88 |
| Seed oysters and clams | *Crassostrea gigas, Venerupis Philippinarum, Crassostrea Sikamea* | 1 | 1 | 1 | 0.5 | 0.88 |
| Tilapia | *Oreochromis* sp | 0 | 0 | 0 | 0 | 0.00 |

**Tourism**

Data from dbedt. Used

**Clean Water**

Not much we can do to control marine debris at Hawaii scale

Marine debris as pressure layer

Need to stop at production, at the source.

Temporal and Spatial Analysis of Marine Debris

Jordan Toshimasa Muratsuchi

International coastal cleanup was annual event now year round post 2016

Data good from 2008 to 2016

Methods:

Debris per person per mile as reference. Per person cleaning up

Is debris on Hawaii increasing?

Declining slightly since 2008 – how much

References

Jambeck et al 2015

What proportion is Hawaii based vs external sources? Tsunami marine debris?

If Hawaii ends single use plastics what present reduction in marine debris would you expect?

Windward vs leeward affects?

Clean water reference – more pick up = less in environment 30% reduction in marine debris – fit with 30 by 30 target 30% reference

Marine Debris