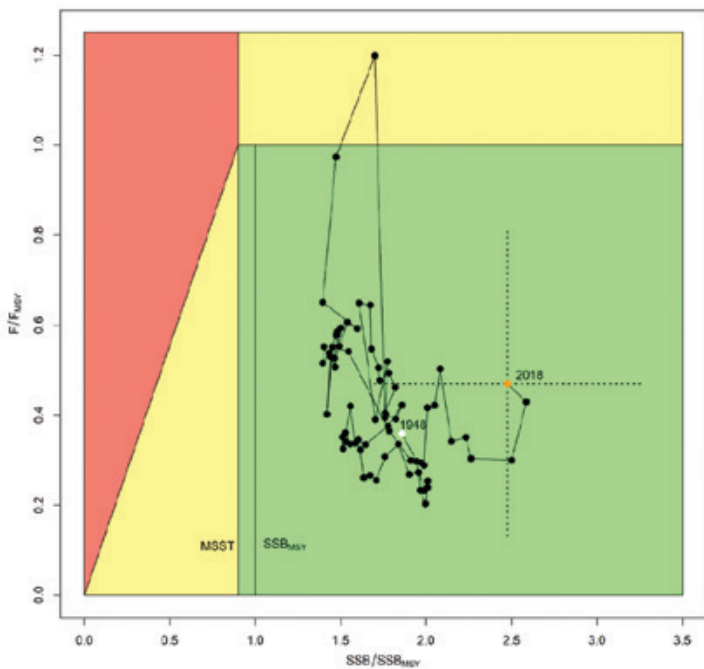


# Science & Management 101: What is a Kobe Plot?



Above: This example Kobe plot is from a recent main Hawaiian Islands uku stock assessment and indicates that the stock is not currently overfished and overfishing is not occurring.

A **"Kobe plot"** (first used at a meeting in Kobe, Japan) is a visual way to show the status of a stock. The plot is divided into four panels which correspond to a particular condition of the stock (overfishing, underfishing, overfished and underfished). By developing a ratio of how much fishing is occurring (F) versus the estimated number of fish (B) for any particular fishery, a point can be plotted in one of those four panels, thus telling the status.

The Kobe plot can be broken down into two parts: amount of fish and the fishing effort.

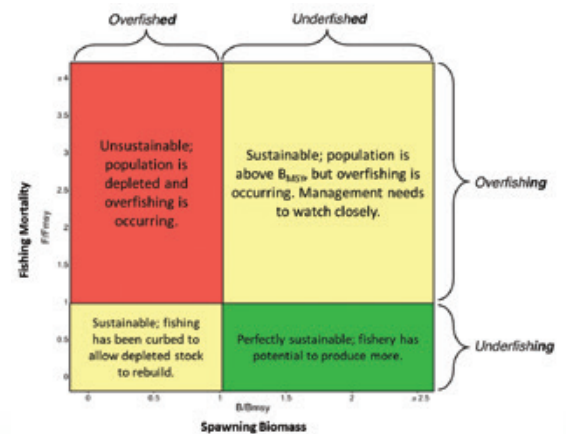
The amount of fish is called biomass (B) and represents the population level. On the Kobe plot, a line is drawn vertically at the point where there is just enough bio-

mass that the amount of fish taken doesn't affect future spawning ( $B/B_{MSY}$ ,  $MSY$  = maximum sustainable yield). To the left of that line, too many fish are being removed from the ocean and the stock can't keep up with replacing itself (overfished). To the right, the amount of fish taken still allows for the stock to replenish itself (underfished).

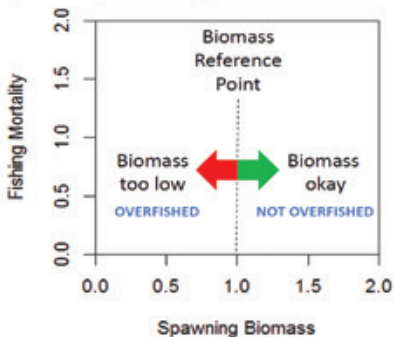
Fishing mortality (F) is the amount of fish killed by fishing and can provide a reference for how much fishing can occur without affecting the sustainability of the stock. A horizontal line on the Kobe plot provides the point where the fishing effort (not the amount taken, or B) can impact the amount of fish available ( $F/F_{MSY}$ ).

Above the line, so much fishing is occurring that, if continued, the stock could become overfished (the definition of overfishing). Below the line, the amount of fishing will not affect the amount of fish in the population (underfishing).

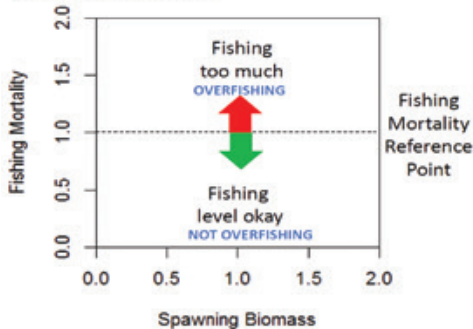
The Western Pacific Council assesses targeted fisheries like tunas, bottomfish and uku, but also manages incidentally caught fish like billfish (marlins) and bycatch such as sharks. If the Council finds that a fishery is overfished or overfishing is occurring, then it is required to take action by creating a stock rebuilding plan, which could include management measures such as reducing annual catch limits. 🐟



The Kobe Plot (a fishery summary)



The Kobe Plot (a fishery summary)



The goal of management is to get a fishery as close as possible to the intersection of the two lines.

Sources:  
Victor Restrepo  
<https://sustainablefisheries-uw.org/seafood-101/overfished-overfishing-rebuilding-stocks>