

## **Agenda Topic 10C**

### **“The Economics of Invading Lionfish”**

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Lionfish are pervasive in United States marine waters and their patterns of spread have been relatively well-documented using computer simulation. Basin-scale ocean connectivity of lionfish populations is directly relevant towards planning lionfish control regimes and costs, given that culling fish in one region can vastly affect populations in downstream nations. Valuing lionfish damages and the benefits of lionfish control, however, is more problematic. This difficulty is because the fiscal contributions of the ecosystems that lionfish have impacted are largely unknown. Still, ecosystem damages caused by lionfish - in the form of the loss of fish biomass and recruitment - have been measured in the field. These studies, therefore, can parameterize evaluations, using methods such as Habitat Equivalency Analysis (HEA), which can then lend insight into the true fiscal costs of the fish.

Using realized lionfish damages to define a HEA, a monetarily unit-less measure of ecosystem service damage – the loss of Discounted Service Unit Years – can be quantified. Simply defined, a DSUY is the total quantity of an ecosystem service or function provided by one area unit of that ecosystem for one full year, adjusted annually by the rate of monetary inflation. DSUY's can subsequently be used to calculate the cost of invading lionfish if the value of the damaged resource and the area impacted by the species is known. Further, this method can be used to value the efforts of lionfish control if the recovery rate of an ecosystem removed of lionfish has been measured. The data provided by HEA, therefore, deliver a platform upon which to quantify present and future fiscal costs of the lionfish invasion and also to value lionfish control efforts.