

## Transfer potential of fish parasites across the Panama Canal

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Anthropogenic advances have been causing a redistribution of species across the globe. Non-native species are being brought into novel environments where they have the possibility of outcompeting native species and altering the community structure of an ecosystem. Many factors can determine the successful invasion of a species, one of which is alterations in host-parasite dynamics, not only with parasites from their new range, but their native as well<sup>6,7</sup>. Invasive species carrying parasites with them into new ecosystems can lead to emerging diseases effecting both human health and the health of the entire ecosystem<sup>1</sup>.

The Panama Canal has been shown to be an area with very high amounts of marine invasions<sup>5</sup> and its recent expansion has been a cause for concern about the higher potential for transfer of organisms, including parasites, across the Canal<sup>4</sup>. The freshwater buffer area, Gatun Lake, is meant to limit crossing of marine organisms, yet, many species have successfully moved between the Atlantic and Pacific. In order to determine a parasite's potential to invade new areas of the Canal or cross to the other side, extent of host diversity must be understood<sup>2</sup>. This includes analyzing both parasite species abundances and richness and determining the marine fish they are most likely to use as hosts.

Many studies have shown that introduced species lose many of their native parasites and obtain very few novel parasites within their new environmental range<sup>1,7</sup>. This decrease in parasites can help explain the general success and quick spread of invasive species without the same parasitic burden as native organisms. Research has also shown that this decreased parasite presence in introduced species allows them to be more competitive, often increasing predation on the more vulnerable native species infected by the parasites<sup>3</sup>. This study aims to understand the potential for parasite transfer across the Panama Canal through marine fishes entering its freshwater areas as well as look at the factors surrounding their survival. This will lead to a better understanding of community dynamics in this area and give an idea of how to protect the area from harmful invasions.

This study focuses on investigating parasite species composition and how it varies depending on both species of parasite and host. These abundances will be analyzed spatially across the freshwater areas of the Canal and discussed on both a population and community level. Understanding transfer potential is essential to see how parasites could have the possibility of effecting novel marine communities. This takes into consideration both the ability of the parasite to be transferred by its host and if the parasite has the mechanism for survival in a novel range. In identifying the potential for transfer, the parasite abundance and species richness of certain areas will be considered to determine potential pathways.

### References

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