University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Doctor of Philosophy

of

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MSc (Instituto Politecnico Nacional, 2011)
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"Ecological Importance of Nearshore Habitats to Sustain Small-Scale Fisheries"

Department of Biology

Thursday, April 19, 2018
2:00 P.M.
Clearihue Building
Room B017

Supervisory Committee:
Dr. Francis Juanes, Department of Biology, University of Victoria (Supervisor)
Dr. Rana El-Sabaawi, Department of Biology, UVic (Member)
Dr. Natalie Ban, School of Environmental Studies, UVic (Outside Member)
Dr. Mark Tupper, Department of Marine and Environmental Sciences, University of Trinidad and Tobago

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Dr. Peter Wan, Department of Chemistry, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

In the marine realm, there has been considerable habitat degradation caused by multiple human disturbances that often act synergistically, strongly affecting fish and invertebrate populations and, consequently, one of the major stakeholders of these resources, fishers. However, the mechanisms underlying how marine habitats support fisheries remain understudied. In this dissertation I examined the importance of fish habitat at global, regional and local scales in two distinct systems (mangrove habitats in the tropics and rockfish habitats in inshore waters of Vancouver Island) combining a suite of different approaches. First, I explored the mangrove-fishery linkage relationship by conducting a global meta-analysis. I found strong evidence supporting the importance of mangrove area to enhance fisheries. This relationship, however, varied across countries, likely based on regional geomorphological settings and fishery management policies. Subsequently, I determined the use of mangrove and adjacent habitats by fish in a tropical lagoon system in the continental Caribbean (Colombia), systems often overlooked in the Caribbean when analyzing mangroves as fish habitat. I collected fish with gillnets at different distances from mangroves and at different sites within the same lagoon system. While fish used mangroves, fish abundance was not higher in these habitats compared to adjacent ones, as predicted. However, diversity tended to be higher in mangroves. Nevertheless, the major driver affecting abundance, diversity and biomass was salinity. That is, diversity and abundance decreased as salinity increased. Next, I used a Local Ecological Knowledge approach to explore the mangrove-fishery linkage relationship because fishers are seldom incorporated into such relationships. By conducting a semi-structured interview I found that fishers fish close to their village and to mangroves, that in addition to fishing they use mangroves for firewood and as construction material. Fishers also agreed that mangroves are important for their fishing activity, as these habitats are critical for fish and crustaceans caught in the system. Finally, I examined the importance of derived benthic parameters for rockfish abundance and distribution at large spatial scales (100s km) in inshore waters of Vancouver Island. I established that higher complexity better explains presence and higher abundance of rockfish. Furthermore, the results provided valuable information for fishery and spatial management and habitat conservation to help recover rockfish populations. All together, these findings highlight the urgency to preserve coastal marine habitats for both juvenile and adult marine organisms to sustain artisanal fisheries as a food source and for traditional purposes. While conserving habitats is a key component of a broader and more complex ecosystem approach that includes overfishing and other anthropogenic pressures, if the former two are not equally managed the chances of success are minimal.