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Thurs, 1 Oct 2020 | 3 pm | Online Zoom Session

Hosted by Prof Koh Lian Pin

Beyond Ecosystem Boundaries: Impacts of Connective Exchanges at Seascape Scales

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By **Lucy Gwen Gillis**

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Global and local stressors are threatening tropical coastal seascapes. Connective exchanges between productive mangrove forests and seagrass beds could be crucial in supporting stressed ecosystems at seascape scales. However, research has mainly focused on species specific biological connectivity whilst physical connectivity has largely been unexplored. Without understanding the impact of physical connective exchanges (nutrient, sediment, hydrodynamics) on fundamental ecosystem processes, we cannot begin to grasp interactions between these two foci under stressful conditions such as global warming or eutrophication. My research aims to establish connectivity drivers between ecosystems and to determine if connective exchanges support mechanistic processes which inform ecosystem services. To understand broad processes, I implemented regional and global field campaigns across isolated and connected ecosystems. These large-scale field campaigns were combined with smaller scale manipulative experiments using flumes and mesocosms to give insights into mechanistic processes. Initial research showed coral reefs physical structure reduced hydrodynamics for seagrass bed and mangrove forest establishment, whilst mangrove forests and seagrass beds decreased nutrient and sediment fluxes to coral reefs which are adversely affected by poor water quality. Further results established connectivity is widespread. Plant communities and their associated traits regulate connectivity and facilitate physical connections. For example, morphological traits altering hydrodynamic conditions enhance particle accumulation, thus buffering connected ecosystems from turbidity. I coordinated a global monitoring program which found connectivity is important for blue carbon accumulation. This research highlighted that plants change their physical traits when facing multiple stressors' such as global warming and eutrophication, these changes in plant traits will alter connectivity strength, thereby affecting ecosystem services facilitated by connective exchanges. Connectivity is crucial for enhancement of seascape resilience but should be combined with sustainable management to facilitate connective exchanges, which are essential in improving ecosystem restoration.