

Upstream-Downstream: wetlands connect us all

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Freshwater is the one natural resource upon which all life depends and it is wetlands that capture and deliver this to us all. Our bodies are made up of 80% water and our health and well being depends upon the quality of the water that we derive our sustenance from and are closely connected with. The wetlands of Fiji can be divided into five main types: mangrove forests, peat bogs, rivers, lakes and reservoirs. Also, in the tropical island context, it is appropriate to think of fringing coral reefs as wetlands as they too are intimately connected to the activities within the river basin. While all of these wetland types are certainly important, here we are focussing on the issues associated with the most common wetlands in Fiji, rivers and streams, and looking after them for our own health and well being.



What is a river basin? A river basin is the land that water flows across or under on its way to a river. Just as a bathtub catches all of the water that falls within its sides, a river basin sends all of the water falling within it to a central river and out to an estuary or to the ocean. All of us live somewhere in a river basin and we are all users of water in river basins. Whoever we are, a farmer, fisher, factory owner, or family – our activities will impact on the basin in which we live and in-turn influence our own health and well being. This year's theme, Upstream-Downstream: wetlands connect us all, is an important opportunity for us all to reflect on how interconnected we all are within a river basin, how we can be impacted by the activities of those upstream of us and how our activities affect those downstream. Unfortunately, the recent devastating floods here in Fiji have served as a painful reminder of this fact and the dire consequences of poor river basin management.

The value and importance of wetlands to our lives, in general, and good river basin management, in particular, cannot be overstated. Naturally flowing wetlands do provide flood alleviation but our poor planning while engineering dams, levees, canals, reclaiming of mangroves and logging of riverside vegetation has created a situation where now over 2 billion people worldwide are living in flood risk areas.

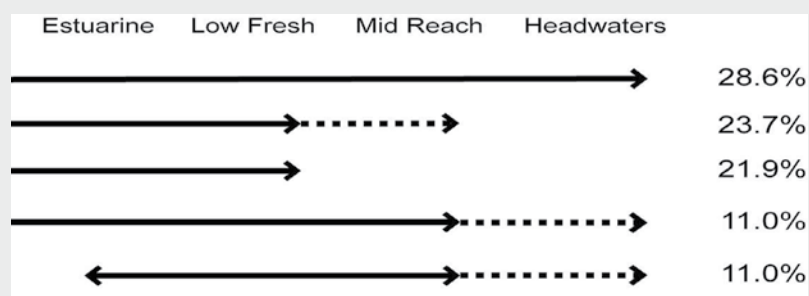


The continued lack of comprehensive river basin management increases the number of people each year who are at risk to flooding in Fiji, as clearly illustrated in the recent devastating floods this year. Wetlands and groundwater resources are also closely linked, with groundwater providing the drinking water for over half of the world's population. Wetlands act as water purifiers, trapping sediment and removing excess nitrogen and phosphorous from water and even some diseases. Inland waters are only 1% of the world's water but are home to 40% of the world's fish species and provide 10% of the global fish catch, employing 50 million people! Mangroves and coastal wetlands provide critical nursery areas for marine fishes while also preventing coastal erosion and trapping sediment before it smothers reefs. Wetland plants are extremely important with the most famous wetland plant, rice, a staple food for half of the world's population.

A recent global study (the Millennium Ecosystem Assessment) ranked Wetlands as the most threatened type of ecosystem on the planet by far. Highly used and terribly abused best describes the river basins of the world, with only 21 of the world's 177 longest rivers flowing freely from source to sea. In our quest to deliver benefits to people such as irrigation for crops, improvement to river navigation or protection from floods, we have changed the natural flows of rivers worldwide with dire consequences both upstream and downstream of our actions. We are chopping down the forests that keep the soil erosion at bay and stabilize our river channels, we are fragmenting our water ways with dams, culverts, pipes and road crossings, we are extracting water excessively, overharvesting our fisheries resources, introducing invasive pest species and, to top it all off, dumping our domestic and industrial waste directly into these waterways. These are just a few common ways that we are abusing the very systems that we are entirely dependent on for life.



These river and stream wetlands are connected by more than the flow of water, however, and should be considered as a living system with "flows" of living organisms that underpin and are indicative of the health of a river system. The Fiji Ecosystem Based Management project, led by a consortium of NGOs, USP, several government bodies and communities, is beginning to document exactly how connected these aquatic life systems are in the Fiji high island context from the headwaters of rivers to the coral reefs in the ocean. For example, Fijian wetlands, from freshwater to estuaries have approximately 164 species of fishes. Based on extensive field surveys and literature review we now understand that 96.4% of these fishes will interact with the sea either for feeding or breeding and all



will move across 3 or more habitats during their lives. If there were no large waterfalls or manmade barriers then over 50% would move across all 5 habitat types, but in-fact, about 28% will make this full migration from headwaters to the sea and all the way back. This highly migratory group of fishes are the embodiment of the living connections of river basins from headwaters to ocean and include freshwater eels (Duna), worm eels (Balolo), Freshwater moray (Dadarikai), gobies (Beli), flagtails (Ikadroka) to name a few. Also within this most highly "connected" group are freshwater prawns (Ura) and snails (Cici).

Figure 1. Percentage of Fijian freshwater and estuarine fishes that are connected across different wetland habitats during their life history.

In this supplement, we are only beginning to scratch the surface of how connected we all are to our river basins and the critical importance of approaching management at the river basin scale. While national governments may control the management of a basin, there are many other 'management units' that must have the capacity, both financial and human, to operate at the basin, sub-basin, and local levels, and at all these levels wetland managers and local communities have to be actively engaged in ensuring that planning and implementation maintain the integrity of wetlands. There will always have to be trade-offs between human water needs and the water needs of wetland ecosystems to fully maintain their functions, and it is here that the real economic value of ecosystem services can present strong arguments in favour of wetlands. In conclusion, a whole-of-ecosystem approach to managing our highly connected wetlands should at least consider the following five Ecosystem Based Management (EBM) principles which relate directly to river basin management:

1. **Successful EBM relies on cross-sectoral management** – *governance must occur across forestry, agriculture, fisheries, lands, health, tourism and private sectors*
2. **Inland and lowland communities must manage resources together** – *communities must work together to manage across inland and lowland habitats*
3. **EBM protects habitat for all stages of life** – *understanding natural life history links across upstream and downstream habitats*
4. **Improving both land use & fishing practices helps protect natural resources** – *promoting and enforcing best code of practice in linked habitats*
5. **Public health depends on environmental health** – *making the critical link between natural resource and health sectors*



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