



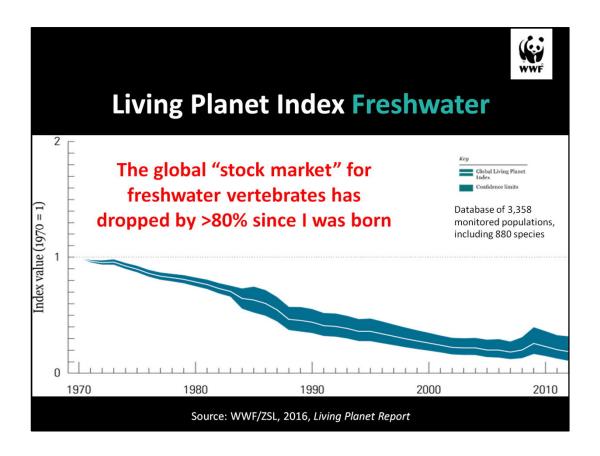
WWF's mission is to stop the degradation of the planet's natural environment & build a future in which humans live in harmony with nature, by:

- 1. Conserving biological diversity
- 2. Ensuring sustainable use of renewable natural resources
- 3. Promoting reduction of pollution & wasteful consumption.

We organise our work around nine inter-linked global practices, including a global Freshwater Practice.

WWF's Freshwater Practice's overarching purpose is to reverse the decline in biodiversity in rivers, lakes and wetlands and to help ensure that healthy freshwater ecosystems support human well–being and development.

Our Freshwater Practice goals focus on 1) protecting or restoring key wetland habitats and species, and 2) safeguarding or restoring clean, flowing rivers at the basin scale.

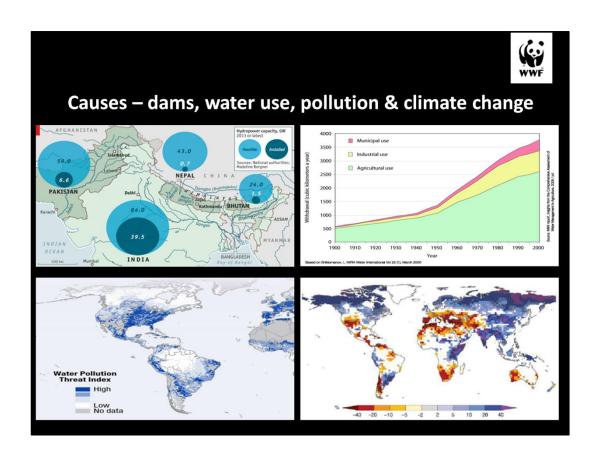


At the global scale, WWF uses the Living Planet Index (LPI) – a peer-reviewed measure of changes in populations of vertebrate populations around the world, developed by WWF and ZSL and widely used by international organisations – as a key indicator to gauge how the world's biodiversity is responding to threats and to conservation initiatives.

The LPI is akin to a stock market index for the health of the world's wildlife.

The Freshwater Living Planet Index, which is derived from more than 3000 populations of 880 freshwater species, shows that over the last 40 years, the decline in freshwater species populations has been more than twice that observed in the world's forests or oceans.

Imagine the response from the world's governments and businesses if the Dow Jones, FTSE and TSX stock markets dived by 80% over a prolonged period of time ...



Many factors have contributed to the precipitous fall in freshwater biodiversity. At the global scale, the major causes have included a proliferation of dams, rapid increases in water abstractions from ecosystems (linked primarily to growing demands for water from agriculture), heavy pollution loads from multiple sources, and a shifting climate.

All of these issues are compounded by challenges of inadequate (water) governance, flows of finance to unsustainable activities and a 20th Century water management paradigm which emphasised taming rivers and treated ecosystems and biodiversity as expendable.



Restoring or safeguarding river flow regimes is an issues that runs through each of these causes and challenges and has been a major focus of WWF's work in recent years. Our emphasis has been on practical approaches to implement environmental flow regimes, rather than only on scientific assessments of e-flows. This work has often been undertaken in developing or emerging economies where river management challenges are profound and pressures on ecosystems are most acute.

The reports shown here are a selection. More can be found on WWF-UK's website

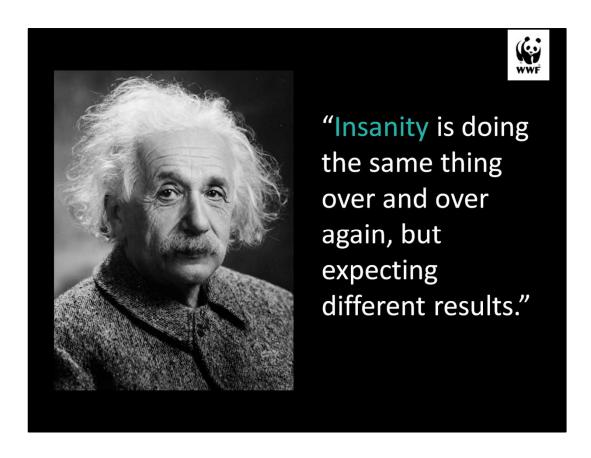




Implementing e-flows: Six insights... Part 2:

Einstein's approach to environmental flows?

BRENT STIRTON/REPORTAGE BY GETTY IMAGES/WWF



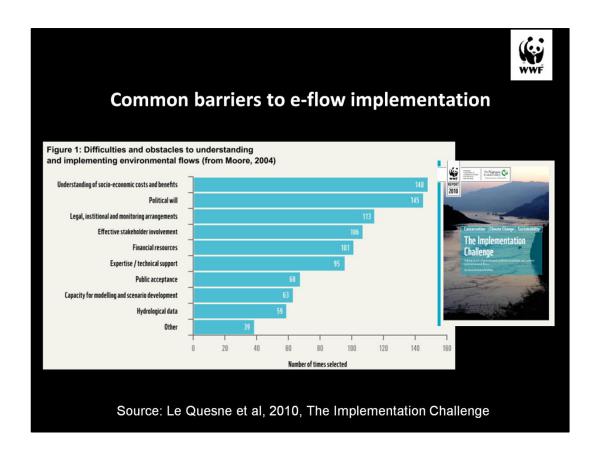
A famous quote often attributed (perhaps wrongly) to Albert Einstein.

Across the world, we have often done the same things with respect to freshwater conservation generally, and environmental flows specifically. Yet indicators of the health of rivers, such as the Freshwater LPI, continue to plummet.

Are we insane?

Or, a more useful question: what should we do differently to bring about e-flow implementation and positive conservation outcomes more widely?

To answer this question, first we need to understand what the barriers have been to implementation...

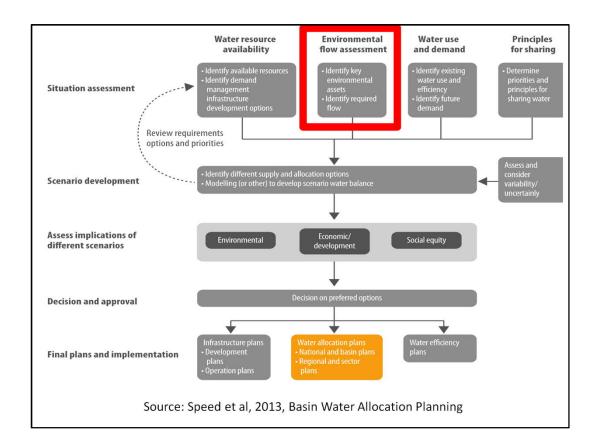


Most countries have e-flow policies. Indeed, it can be difficult to find nations which don't have some sort of provision for e-flows or environmental reserves embedded somewhere in their water policy or legislation.

But few countries have made significant strides towards widespread implementation of environmental flows, i.e. water in the river.

A study by WWF and TNC, published in 2010, found that common barriers to implementation mostly linked to economics, politics, institutional blockages and stakeholder perceptions.

Communication is a common challenge which cuts across this – to increase the prospects of e-flows actually being implemented, environmental flow experts and water resource managers have to pay greater attention to communicating, in straightforward terms and to all relevant stakeholders, what the risks and opportunities are.

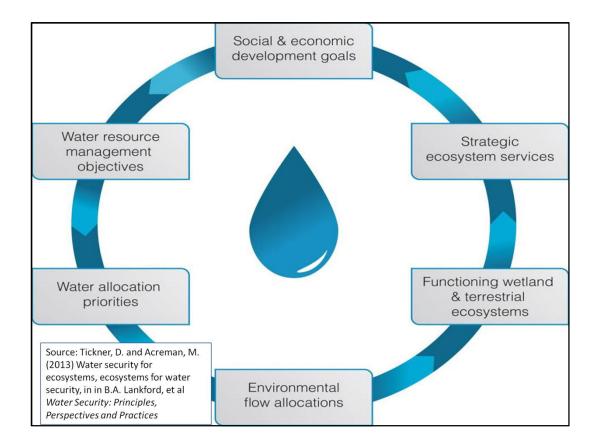


Linked to this, one of the things we have learned in WWF is that e-flows are only one (often quite small) element within wider water resource management regimes.

This figure illustrates the stages typically involved in a formal water allocation regime. E-flow assessment (highlighted in the red box) is just one part of the early situation assessment which subsequently feeds into scenario development, trade-off assessment and decision-making.

INSIGHT #1: It's critical for e-flow practitioners to understand how the wider water resource management system works at the outset so that e-flow assessments can be tailored to provide information that is relevant to decision makers at subsequent stages.

This understanding should then influence not only technical aspects of e-flow assessments, but also stakeholder engagement and approaches for communicating with decision-makers such that processes are transparent, efficient and effective.

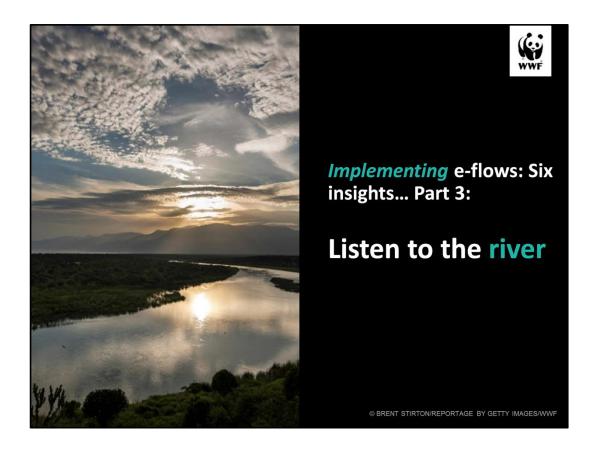


In fact, I'd go further and suggest that it's also important to understand how e-flows and the water resource management system fits with broader development policies and priorities.

Often, decisions that influence the flow of water through rivers, lakes and wetlands are made beyond relatively weak (in political terms) water management agencies, especially when the decisions concern major infrastructure or agricultural development schemes.

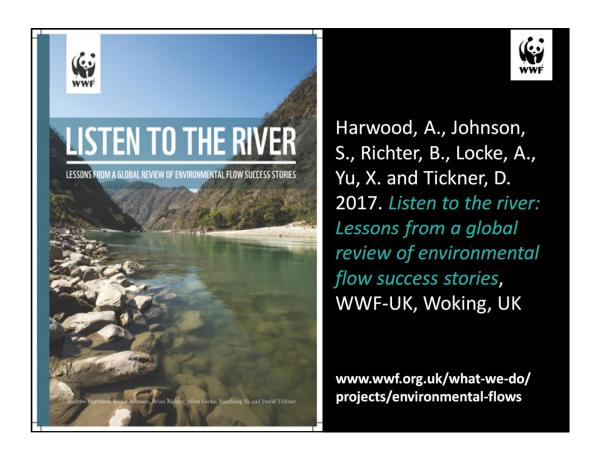
INSIGHT #2: Understanding the priorities of higher level decision-makers – and the indicators and language they use when they talk about these priorities – can help us frame evidence and narratives in order to maximise opportunities for e-flow implementation.

The science of e-flows has made some progress on this as it has evolved from a focus on the flow requirements of particular species through to broader approaches (such as the Building Block Method) which draw on social, as well as biophysical, science. But more needs to be done to link with other disciplines and sectors so that we can make the case for e-flows that help deliver broader benefits for society.



Since WWF and TNC published The Implementation Challenge in 2010, more and more anecdotal stories have reached us of places where flows in rivers have been safeguarded or restored.

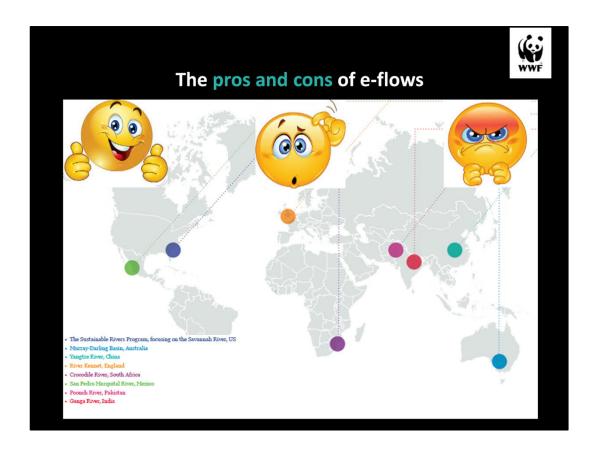
In the spirit of appreciative inquiry, we decided to take a closer look at some of those stories to see if we could learn anything from them...



Early in 2017, WWF commission Ecofish – a Canadian consultancy (who will, I think, be represented during this conference) – to undertake a review of environmental flow successes around the world. The team there was led by Andrew Harwood and we were fortunate to have several other great brains involved, all of whom helped the project run very smoothly.

The report from this project was published during the 20th RiverSymposium and Environmental Flows conference in Brisbane last September.

Ecofish have prepared a poster for this conference which provides more detail.



We asked experts around the world to nominate case studies of successful e-flow implementation – not just in terms of science or policy advances, but examples of where had been retained or restored to rivers, lakes or wetlands.

From a longlist of more than 30 such cases, we selected eight to study. These eight cases reflected varying socio-economic, cultural, and hydrological contexts and different stages of implementation, from projects that had only just reached the stage of implementing a trial flow (e.g. the Ganga, India) to those (e.g. in the US) which had seen environmental flows implemented for a decade or more.

Ecofish then conducted structured interviews with stakeholders who had been involved in the e-flow implementation process. Typically, we spoke to at least one person who had advocated for e-flow implementation, one person who had been sceptical, and one person – normally from a water management agency – who had been charged with making decisions about water allocations or infrastructure operations.

The purpose of the structured interviews was to understand the real-life, often rather political, and very human story that led to e-flow implementation.

We then synthesised the information we'd gathered from the case studies in order to glean lessons and insights.

'Hot moments' can trigger e-flow implementation		
I	riggers	
1	Drought	Responsive
2	Water supply shortage	
3	Environmental damage	
4	Impacts on human health	
5	Political or institutional motivation	
6	Response to anticipated pressures	Proactive
7	Significant cultural / social events	
8	Climate change	

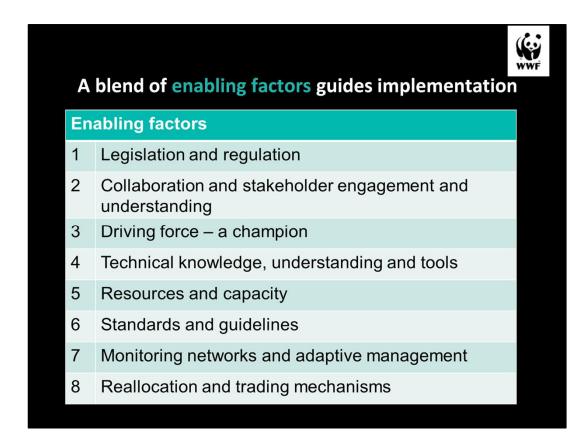
What did we learn?

First, it was clear that a range of different "triggers" had created space for e-flow implementation in different contexts.

In the Ganga, for instance, the impending occurrence in 2013 of the Kumbh Mela (a major religious festival along the banks of the river, involving tens of millions of people) meant that government officials were more open than they might have been to ensuring that water would be flowing along the river. In Australia, the Millennium Drought caused widespread and widely communicated damage to important ecosystems along the Murray-Darling River, leading to a consensus that "something must be done".

Prof Jay O'Keeffe, a particularly wise e-flow practitioner from Rhodes University in South Africa, has called such triggers "hot moments".

INSIGHT #3: Although it can be difficult to predict when such hot moments can occur, in most contexts they will occur at some point. E-flow advocates and water management professionals need to plan how they can grasp such opportunities.



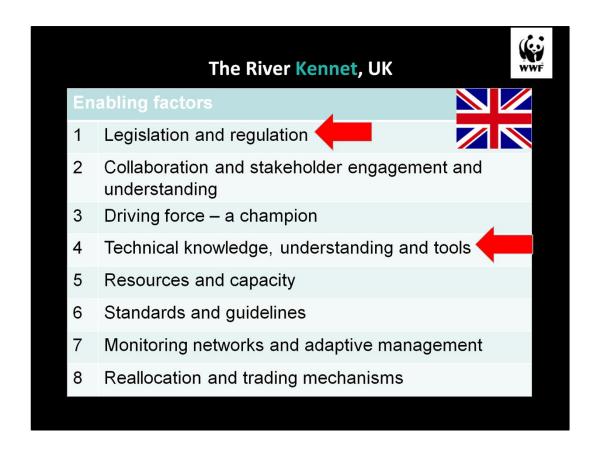
Once the space had been created for e-flow implementation, a blend of enabling factors then determined the implementation process. The nature of this blend varied from place to place (and from time to time).

INSIGHT #4: Context will always be important and there is no universal blueprint for implementation. Nevertheless, some common enabling factors emerged which were, to a greater or lesser degree, important in many places.

We distinguished eight of these enabling factors, described in the table (and, in more detail, in the report).

In a subsequent paper, we distilled this further into four factors which are likely to be important in most contexts: 1) Legislation and regulation; 2) Collaboration and leadership; 3) Resources and capacity; and 4) Monitoring and adaptive management (see Harwood et al, 2018 -

https://www.frontiersin.org/articles/10.3389/fenvs.2018.00037/full)



For example, the River Kennet in southern England suffered from groundwater abstraction (mostly for domestic consumption in nearby towns) that reduced surface flows.

After prolonged pressure from local and national NGOs, the Environment Agency (the water regulator) and Thames Water (the water supply utility) undertook extensive research to evaluate options to resolve the problem. A technical solution was identified, involving substituting a less harmful abstraction from another water source in a different catchment. Robust data and evidence were required to define and understand the problem, and develop an appropriate solution.

The challenge was that the law entitled Thames Water to compensation for giving up its right to abstract from the Kennet. The Environment Agency couldn't afford this compensation.

Further campaigning by NGOs, aided by a sympathetic government minister with a particular interest in river management, was fundamental in securing legislative change. This then enabled Thames Water and the Environment Agency to move ahead with a different economic solution that resulted in flows returning to the Kennet.

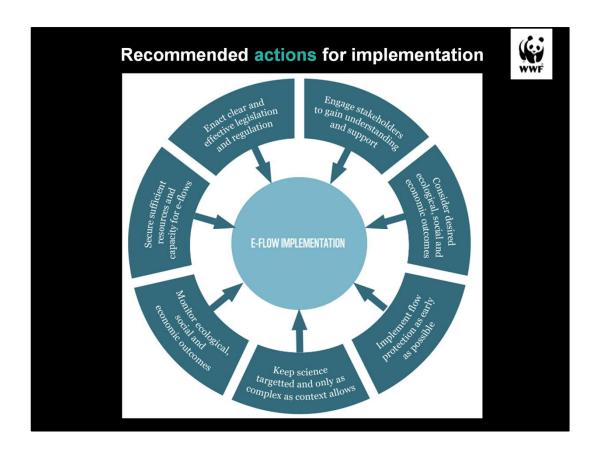
San Pedro Mezquital River, Mexico **Enabling factors** 1 Legislation and regulation 2 Collaboration and stakeholder engagement and understanding 3 Driving force - a champion 4 Technical knowledge, understanding and tools 5 Resources and capacity 6 Standards and guidelines 7 Monitoring networks and adaptive management 8 Reallocation and trading mechanisms

Another example, from the San Pedro Mezquital River in Mexico. Flow regimes in the San Pedro were largely intact but threatened by development proposals. The river is important ecologically and to indigenous peoples.

WWF Mexico, led by Eugenio Barrios (a strong champion for e-flows) worked closely with senior figures in CONAGUA (the water management agency – who later become strong champions themselves) to develop a national approach to defining a system of Environmental Water Reserves, based on existing Mexican water law. The San Pedro Mezquital was one of six pilot projects in which e-flows standards (the norma) were trialled.

Cost-benefit analysis of different flow scenarios was undertaken, pointing to a strong case for safeguarding the water reserve (aka the e-flow regime) in the river.

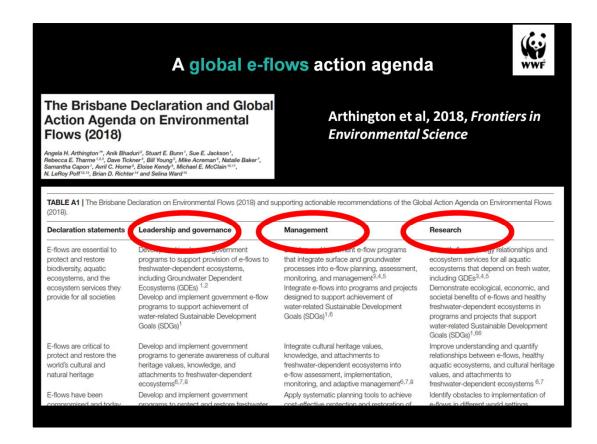
Building on this and the other pilot rivers, e-flows have now been successfully established to protect nearly 200 rivers across the country from over-allocation, including those in arid environments, disproving the myth that there is not enough water for the environment and other users in such climates.



From our case study analysis, we then distilled guidance on the kinds of actions that different types of actors can take to support implementation, ranging from targeted science, through clear legislation, to early flow protection wherever possible.

Again, context matters. This is less a blueprint, and more a typology of actions that can serve as a prompt for different stakeholders to think through what they might do that could help e-flow implementation.

More detail on the typology is in the Listen to the River report.

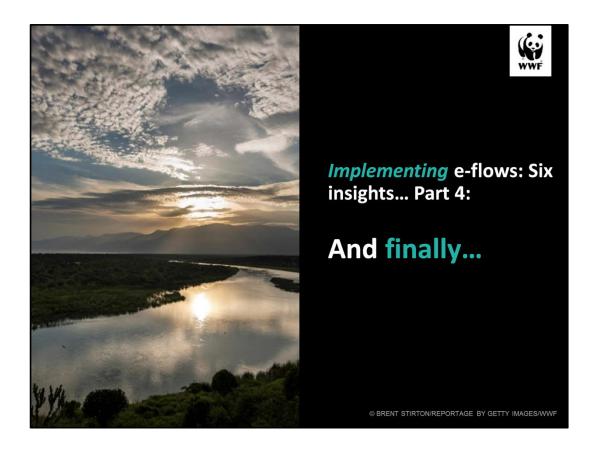


Our Listen to the River report served as a key input into a recent revision of the 2007 Brisbane Declaration and Action Agenda on Environmental Flows. The 2007 Declaration was the first consensus document that bought together the diverse experiences across regions and disciplines, and was significant in setting a common vision and direction for environmental flows internationally.

It was revisited at the 20th International Riversymposium and Environmental Flows Conference, held in Brisbane, Australia, in 2017. The objective was to update the declaration and action agenda to reflect collective progress, innovation, and emerging challenges for environmental flows policy, practice and science worldwide.

The revised Declaration, published earlier this year, presents an urgent call for action to protect and restore environmental flows and aquatic ecosystems for their biodiversity, intrinsic values, and ecosystem services. The new Global Action Agenda makes 35 recommendations to guide and support implementation of environmental flows through legislation and regulation, water management programs, and research, linked by partnership arrangements involving diverse stakeholders.

An important new element of the Declaration and Action Agenda is the emphasis given to full and equal participation for people of all cultures, and respect for their rights, responsibilities and systems of governance in environmental water decisions.



The 2018 Brisbane Declaration and Action Agenda, and a summary of key findings from our Listen to the River report, have been published as papers within a Frontiers in Environmental Science research topic on Implementing Environmental Flows (similar to a special journal issue). You can download them – along with a range of other great papers – for free at https://www.frontiersin.org/research-topics/5740/implementing-environmental-flows-lessons-for-policy-and-practice.

I'd like to finish with a particular nod to one paper that is just about to be published within the research topic, by Jay O'Keeffe. Jay has authored a perspective paper on capacity building for e-flow implementation, drawing on 20+ years of experience running training programmes in many different countries. Some of these training programmes have been run in conjunction with WWF.

There are <u>two lessons</u> from Jay's paper which resonate especially strongly with me, and which chime with our findings from our Listen to the River project...

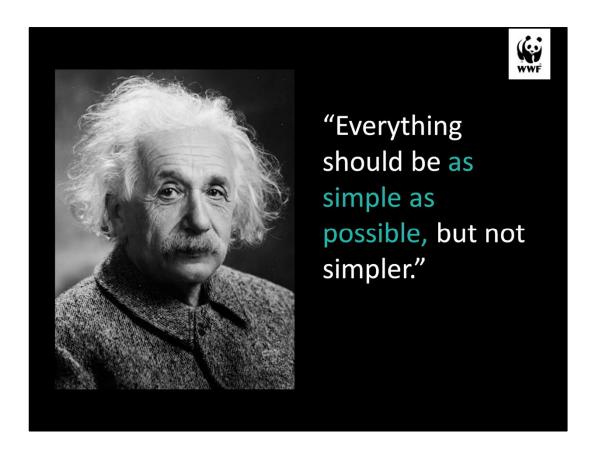


First...

INSIGHT #5: Just as we've heard about the importance of triggers, or "hot moments", it's really important to identify "hot people" who are committed to e-flows and can act as local champions for e-flow implementation.

Committed and effective champions can be the catalyst for initiating all the other enabling factors, but, without one (or more), the process at best becomes disoriented and dis-integrated.

I'm very happy that WWF colleagues such as Eugenio Barrios (WWF Mexico) and Nitin Kaushal (WWF India), have fulfilled this role effectively in their countries for more than a decade. But as Jay states, two champions, or even a group, should be the aim. One should be from the government agency tasked with E flow implementation, and the other(s) may be from a university, research institute, an NGO such as WWF, and/or from a major stakeholder group.



Second... another famous quote often attributed (perhaps wrongly) to Albert Einstein.

E-flows science has flowered over the last 20 years. There are increasingly sophisticated tools for estimating e-flows requirements, taking account of a wider range of biophysical, socio-economic and cultural factors. However...

INSIGHT #6: If e-flows are to be implemented, it's critical that scientific inputs should be as targeted and as simple as possible, rather than comprehensive and ever more detailed.

As Jay O'Keeffe states in his paper, "without the understanding and recognition of the purpose and importance of e-flows, among policy makers, managers, scientists and all other stakeholders, the most detailed scientific analysis will be impotent and unused." He goes on to suggest that the best approach to fast tracking implementation is sometimes simply to find a river which is relatively unstressed (with e-flows still in the river, rather than needing to be clawed back from water users).

Using such rivers to demonstrate in that e-flows can be implemented without huge pain for water users can be important for building understanding and trust. Once this has been done, it is often then possible to engage previously sceptical stakeholders in more complex e-flow dilemmas.

This is the approach WWF has taken in rivers such as the Mara, in East Africa, and the Ganga, in India with some success. I'd be interested to hear of experiences in Canada...



Thank you for reading/listening.