

THE FRESHWATER HEALTH INDEX

MAKING CLEAR CONNECTIONS BETWEEN
ECOSYSTEM HEALTH AND SUSTAINABILITY

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CONSERVATION
INTERNATIONAL



WHY DO WE NEED ANOTHER MONITORING TOOL?

- ✓ Thousands of unique indicators and hundreds of unique indices for assessing freshwater systems already exist.
- ✓ Applications range from ecological assessments of streams, to water “vulnerability” at national scale, to global corporate water risk assessments.
- ✓ But no approaches linked ecological integrity (health) to ecosystem service delivery, or adequately combined social with ecological indicators.

WHAT MAKES THE FRESHWATER HEALTH INDEX UNIQUE?

- **Focus on ecosystems** – identifies opportunities for conservation
- **Scale of assessment** – uses local and high resolution basin data
- **Scenario analysis** – compares current baseline to future changes
- **Stakeholder engagement** – involves decision-makers from all sectors
- **Assesses governance** – addresses underlying root causes

FOCUS ON ECOSYSTEMS

Water risk tools have focused primarily on water quantity and quality – with no explicit recognition of the role that natural capital plays in providing water services.

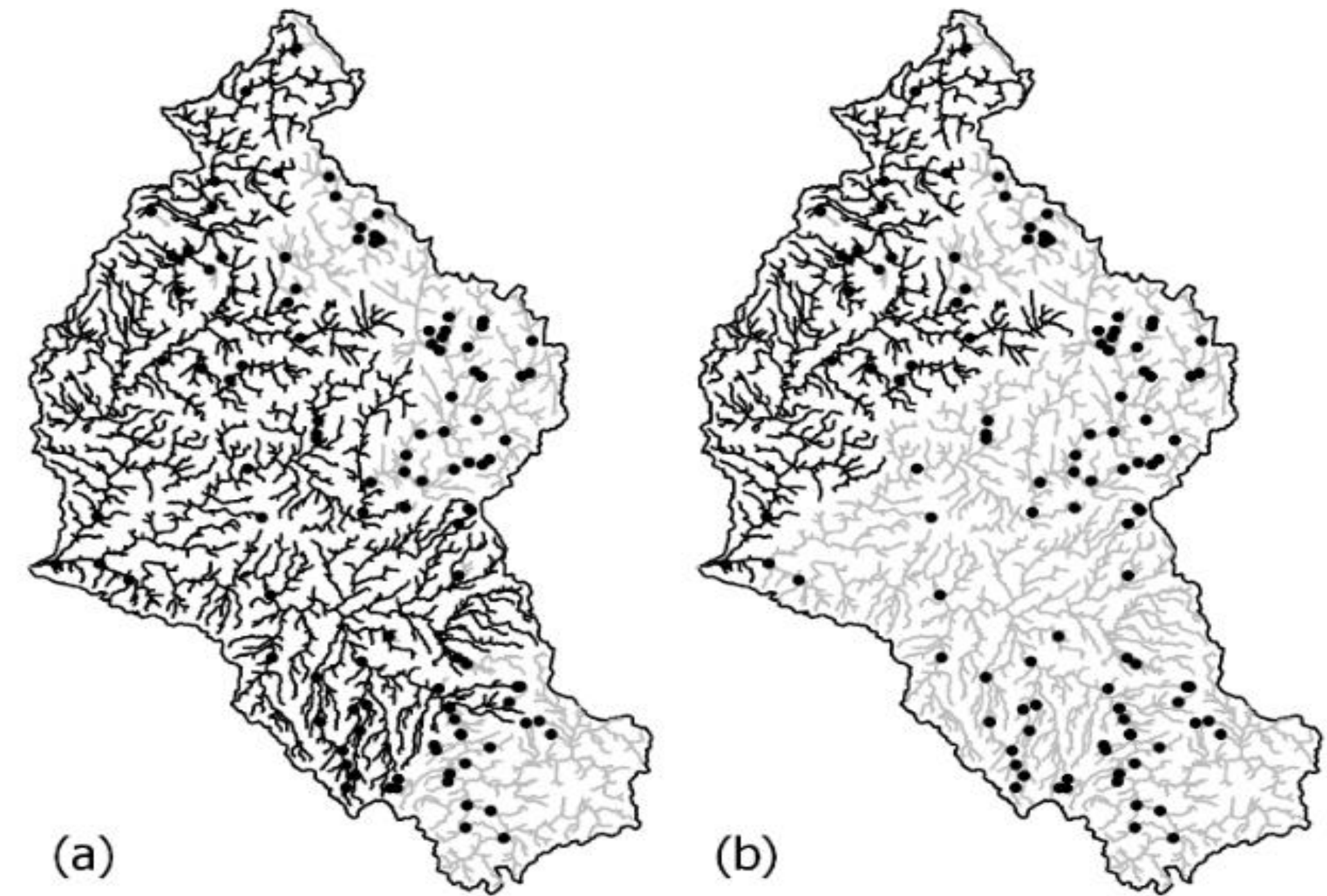
The Freshwater Health Index was designed to put ecosystems at the center of the assessment. By doing so, it helps decision makers make the necessary connections between ecosystem protection and human benefits.



SCENARIO ANALYSIS

- Future scenarios – for climate change, land-use change and dam development – are the most important way that we can influence decisions around investing in natural capital in a basin.
- Scenarios reveal areas that may be threatened in the future (e.g., where dams could impact fisheries) and where ecosystem restoration could have downstream benefits.

FLOW CONNECTIVITY AND DAM DEVELOPMENT



(a)

EXISTING

56

(b)

+LOWER SESAN

27

STAKEHOLDER ENGAGEMENT

- Explicit involvement of stakeholders is a hallmark of the Freshwater Health Index.
- In a series of workshops, decision-makers from the public and private sector, from local agencies to international organizations, share information, debate priorities and provide input to tailor the assessment to their needs.
- This engagement is critical to make results as relevant as possible to the local decision context – and allows stakeholders to rate their preferences for individual indicators.



ASSESSING GOVERNANCE

- FHI was among the first water assessment tools to include governance indicators. This is routinely cited as one of its most innovative and interesting features.
- Measured through a stakeholder survey, which provides a rich dataset on a range of topics.



A lush green forest with a waterfall cascading over rocks. The waterfall is the central focus, with water flowing over several tiers of dark, wet rocks. The surrounding forest is dense with various types of green foliage, including ferns and broad-leaved plants. The lighting is soft and natural, highlighting the textures of the water and the rocks.

HOW DOES THE FRESHWATER HEALTH INDEX WORK?

WHO ARE THE AUDIENCE AND TARGET USERS?

- ✓ Not intended for use by a single person or organization
- ✓ Designed to engage multiple stakeholders – from river basin organizations and water utilities, to regional and national ministries, corporations and NGOs – in a particular basin or region
- ✓ Working together, users can evaluate scenarios, understand the trade-offs of certain decisions, prioritize actions and communicate about basin health with a broad audience.

WHAT IS THE PROCESS AND TIMELINE?

The average time needed to complete a basin assessment is 9-12 months, depending on capacity, participation, data availability and other factors.

Months 1-3: Assessment team reviews existing datasets, establishes contact with any technical collaborators (universities, regional government agencies, etc.), and conducts a preliminary review of stakeholders within the basin.

Months 4-6: Assessment team and technical collaborators perform initial calculations of indicators based on existing data. Assessment team holds a stakeholder consultation forum to introduce the FHI and administer surveys. Assessment team may organize 1-2 technical meetings with collaborators to review initial results.

WHAT IS THE PROCESS AND TIMELINE?

Months 7-9: Assessment team drafts technical report and holds second stakeholder consultation forum to discuss draft report and develop future scenarios for the basin. Assessment team and technical collaborators model scenarios and calculate indicators to compare against the baseline assessment.

Months 10-12: Assessment team finalizes technical report and policy summary and holds a final stakeholder forum to discuss results and prioritize next steps for policy actions or further analysis.

INDICATORS OF FRESHWATER HEALTH

- Combination of remotely sensed, monitored, modeled and survey data
- Each indicator scaled from 0-100 for ease of interpretation
- Ecosystem Vitality and Ecosystem Services indicators can be modeled to assess scenarios

ECOSYSTEM VITALITY

Water Quantity

- Deviation from natural flow
- Groundwater storage depletion

Water Quality

- Suspended solids
- Total nitrogen
- Total phosphorus
- Other quality parameters of concern

Basin Condition

- Bank modification
- Flow connectivity
- Land cover naturalness

Biodiversity

- Species of concern
- Invasive & nuisance species

ECOSYSTEM SERVICES

Provisioning

- Water supply reliability
- Biomass for consumption

Regulation & Support

- Sediment regulation
- Water quality regulation
- Flood regulation
- Disease regulation

Cultural

- Conservation areas
- Recreation

GOVERNANCE & STAKEHOLDERS

Enabling Environment

- Water resources management
- Right to resource use
- Incentives & regulations
- Financial capacity
- Technical capacity

Stakeholder Engagement

- Information access
- Engagement in decision-making processes

Vision & Adaptive Governance

- Strategic planning & adaptive management
- Monitoring & learning mechanisms

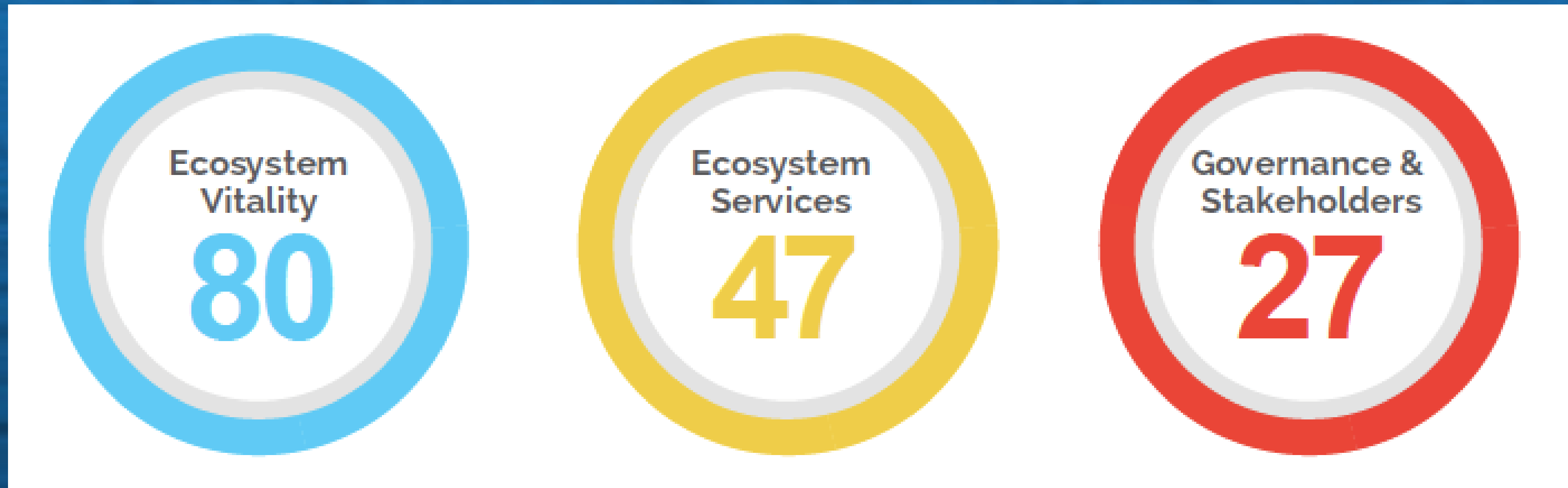
Effectiveness

- Enforcement & compliance
- Distribution of benefits
- Water-related conflict



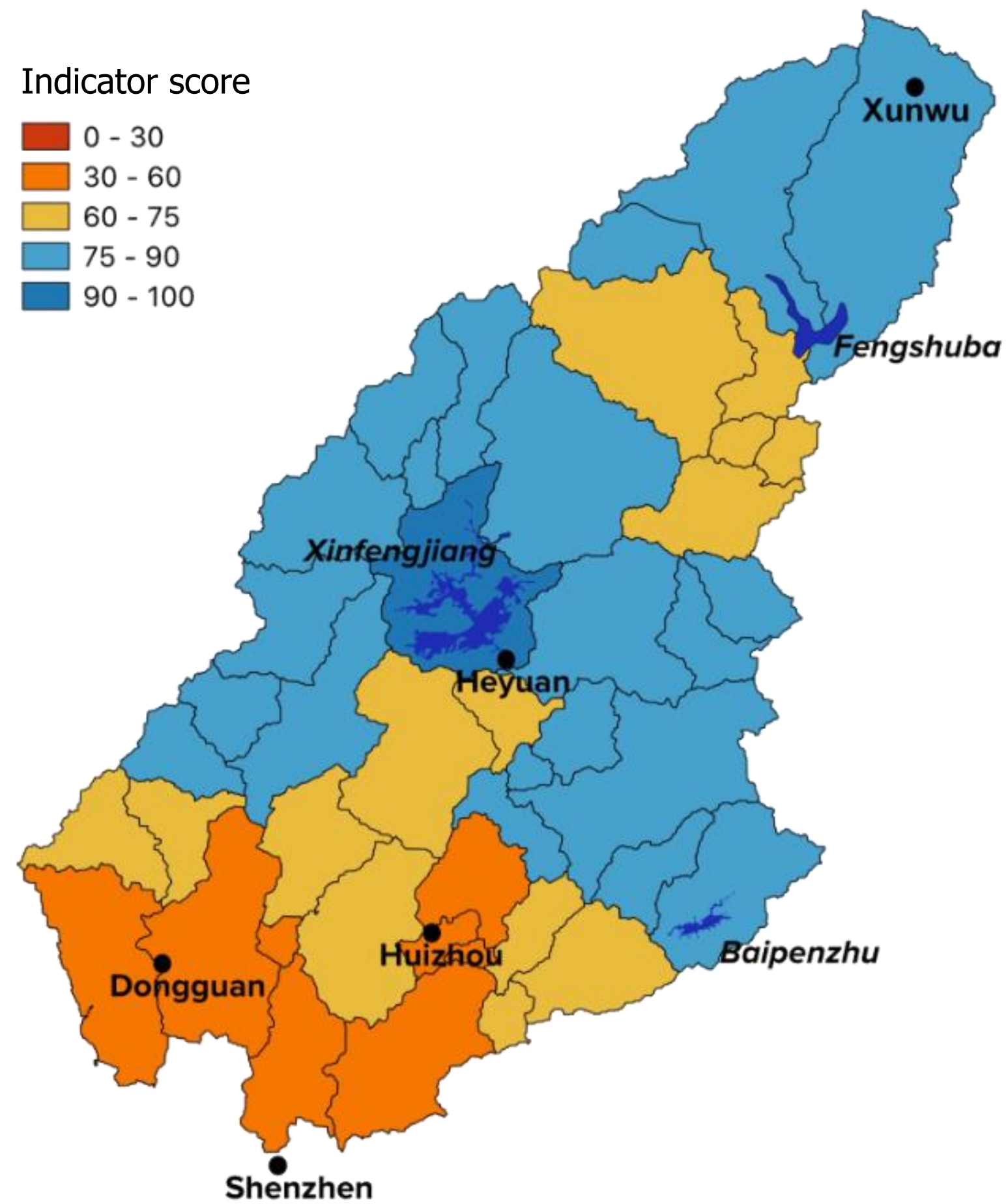
An aerial photograph of a city built on a valley floor, surrounded by mountains. A river winds through the city. The image is split into two horizontal sections. The top section is faded and contains the main title. The bottom section is in sharp focus and shows a park area with a river and buildings.

WHAT DOES THE FHI DELIVER?

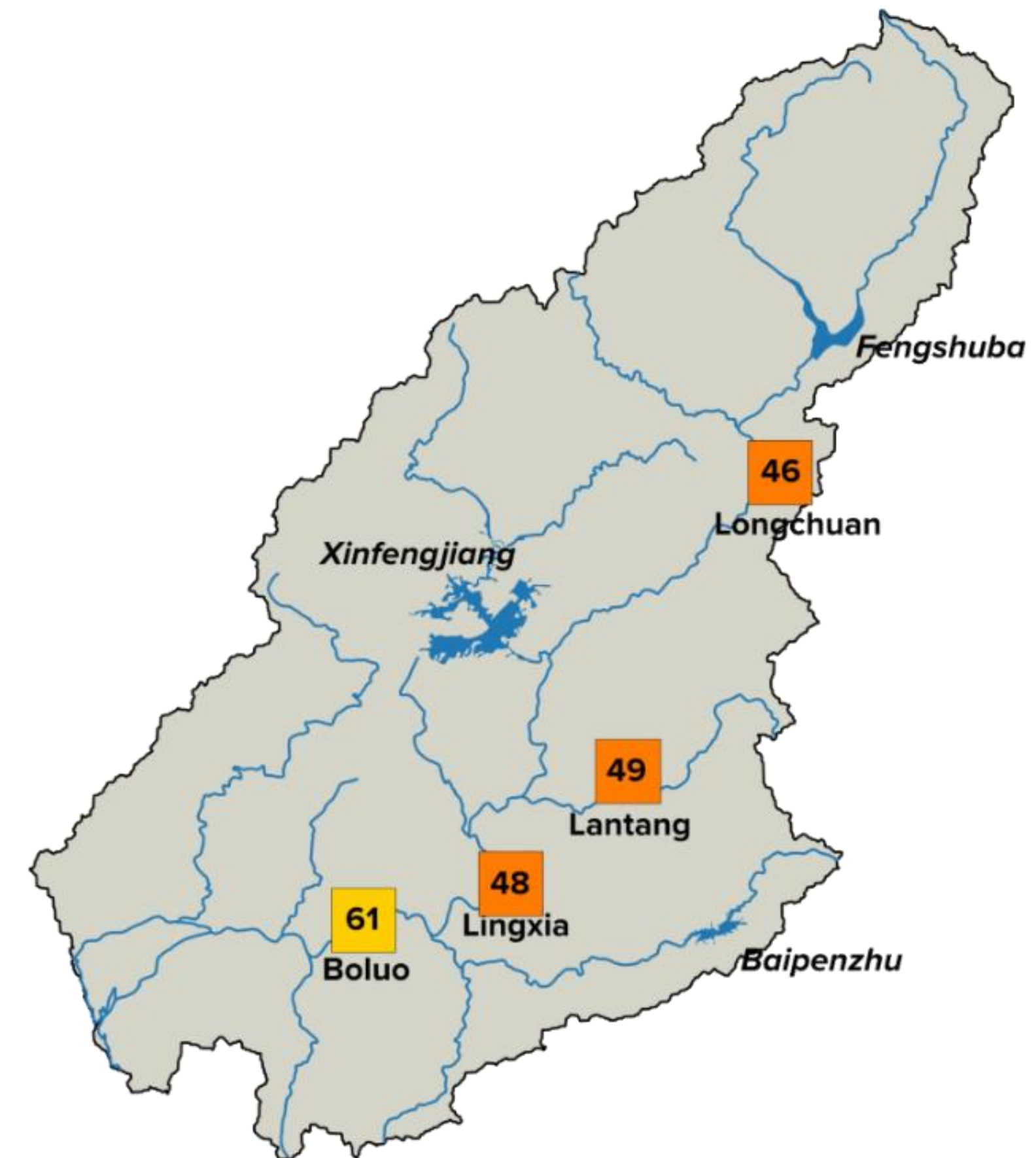


- Top-level results presented to end users
- Three scores (out of 100) for FHI's three main components
- Suitable for the general public, but most end users will want further detail.

REPRESENTING SPATIAL DATA



LAND COVER NATURALNESS
(sub-basin)



DEVIATION FROM NATURAL FLOW
(monitoring station)

TECHNICAL REPORTS

Baseline (current) scores for:

- Ecosystem Vitality, Ecosystem Services, Governance & Stakeholders
- 11 major indicators and their 25 sub-indicators

Maps of scores within the basin to:

- Identify geographic areas of concern
- Highlight variability (e.g. upstream to downstream)

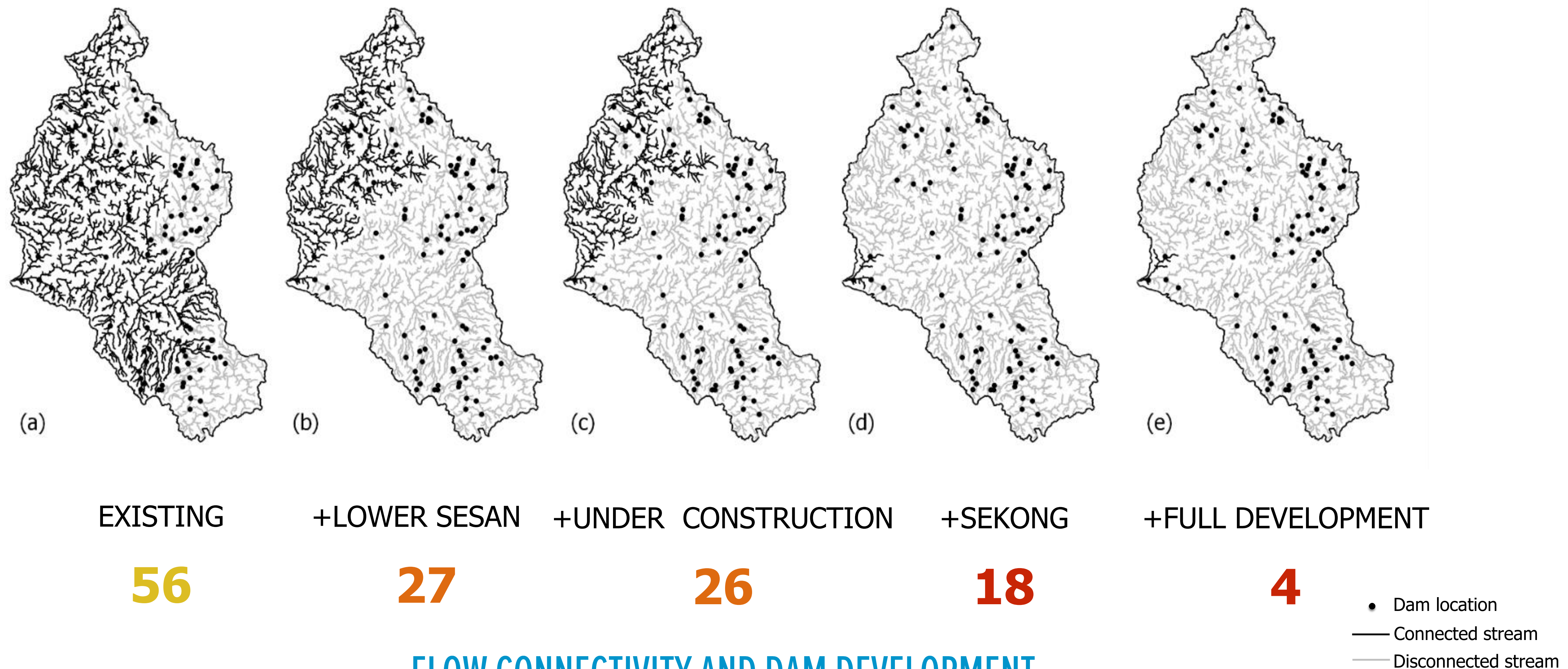
Interpretation of scores and recommendations on areas for improvement or further analysis



中国东江流域
淡水生态系统健康评估

2017年9月

USING SCENARIOS TO ILLUSTRATE IMPACTS



FLOW CONNECTIVITY AND DAM DEVELOPMENT

A young child is sitting in a large metal bowl that has been repurposed as a boat, navigating a river. The child is holding a long wooden pole to steer. The river is surrounded by lush greenery, including large trees and water hyacinths. In the background, a traditional thatched-roof hut is visible, partially obscured by a semi-transparent grey banner that contains the text. The scene is captured in a bright, natural setting.

COMPLETED ASSESSMENTS

WHERE WE HAVE BEEN WORKING



HOW IS THE FHI BEING USED IN ASIA?

- Requests for scenarios around water allocation, rights trading and eco-compensation in China; climate change and land-use change in Lower Mekong
- Partners in Dongjiang basin now working on scenario modeling and improving certain indicators (e.g. biomass and productivity)
- China-ASEAN Center for Environmental Cooperation (CAEC) has independently applied FHI to headwaters of Mekong and Hainan province
- Trainings conducted for key academic faculty and government staff to replicate process in Laos, Vietnam, and Cambodia

ON THE HORIZON



The **Freshwater Health Index (FHI) toolbox** facilitates the implementation of an FHI assessment through a set of indicators that transparently assess the health of freshwater systems, quantifying and mapping the benefits that freshwater naturally provides.

The FHI assessment incorporates three main components:

Ecosystem Vitality: The integrity and functioning of the ecosystem itself.

Ecosystem Services: The benefits to people provided by a freshwater ecosystem.

Governance & Stakeholders: The structures and processes by which people make decisions related to water resources.

Each component is assessed with a suite of measurable indicators. Evaluation of the indicators requires hydrologic and water allocation models, ecosystem service models, valuation techniques and stakeholder surveys. Data is transformed into commonly scaled indicators (on a 0-100 scale), providing a baseline diagnosis of basin health. The toolbox assists in the process of entering and organizing data for indicator calculations.

[Import Basin Shapefile](#)

[Access Manuals](#)

[Case Studies](#)

Results Explorer

Active Basin: Dongtiang 20181202 

FHI SCORES

	Ecosystem Vitality	75
	Water Quantity	71
	Water Quality	65
	Basin Condition	57
	Biodiversity	99
	Ecosystem Services	62
	Governance	85
	Another One	55
	Another One	59

BASIN CONDITION



Score **75**



Export Results

NEXT STEPS FOR THE FHI PROGRAM

- ✓ Begin work on a multi-year project to adapt the FHI methods for finer scale, facility-level assessment (for communities, companies, etc.)
- ✓ Complete and socialize desktop and web-based tool and decision-support platform to enable standardized and widespread application
- ✓ Build capacity through trainings in regions where assessments have already been conducted
- ✓ Explore opportunities to apply the FHI in new geographies and support replication at national and more transboundary scales

THANK YOU!

FOR ADDITIONAL INFORMATION PLEASE VISIT
[FRESHWATERHEALTHINDEX.ORG](https://www.freshwaterhealthindex.org)



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