River Restoration in America: global lessons for bringing back migratory fish

Challenges and potentials of river restoration and conservation in Europe in light of the Biodiversity Strategy 2030
River Restoration Webinar
13 July, 2020

Joshua Royte, Senior Scientist, The Nature Conservancy
jroyte@tnc.org
OUR MISSION IS TO CONSERVE THE LANDS AND WATERS ON WHICH ALL LIFE DEPENDS.
Dams under construction (orange dots) and planned dams (red dots) occur in many of the river basins with the greatest freshwater species richness (dark green indicates high richness of fish species). River basins projected to undergo major expansion of hydropower include the Mekong, Nile and Amazon.
Fish biodiversity and conservation status

Figure 3: The Global Living Planet Index shows a decline of 58 per cent (range: 48 to 66 per cent) between 1970 and 2012. Trend in population abundance for 14,351 populations of 1,706 species monitored across the globe between 1970 and 2012. The white line shows the index values and the shaded areas represent the 95 per cent confidence limits surrounding the trend (WWF/IZL, 2016).

(Migratory Fish LPI 2020
(Deinet, et.al 2020 in print)

Avg. change
1970 - 2016
-76%

-58%

-91%

-36%
Major threats to river ecosystems and searun fish

- Habitat destruction
- Overexploitation
- Climate change
- Human created obstacles
630,000 dams
400,000 more modeled

River status

Free-flowing rivers (CSI > 95% from source to sink)

Good connectivity status (CSI > 95%)

Impacted (CSI < 95%)

VL: Very long river (> 1000 km)
L: Long river (500 - 1000 km)
M: Medium river (100 - 500 km)
S: Short river (10 - 100 km)

No flow
Many of the last free-flowing rivers in the world are slated to be dammed. Many of these are places with the largest freshwater fisheries for people tied closely to these resources. Over 40 million people rely on fish from the Mekong River for their primary source of protein and key nutrients.
River Restoration Lessons from the state of Maine USA
Maine’s Sea-run Fish: 
A diversity of species and life histories
>30,000 dams assessed
Across the Northeast US

Ranked each Dam for:
• Native migratory fish present
• Health of upstream basin/watershed
• Fewest dams per stream mile
Healthy Diverse Freshwater

- Most forested/ha state in US
- Excellent water quality
- Long connected river networks
- Diverse geology & stream gradients
- Multiple temperature zones
- Minimal pavement
- Natural flows/few storage dams
- Healthy umbrella species:
  - 12 species of native searun fish
  - Last best place for Eastern brook trout
70% of US dams are older than their designed life

NY Times 2020 with data from the US Army Corps of Engineers
Stream Barrier Inventory

78% of stream habitat is in small streams

- 26,334 crossings complete (90%)
- 30-57% are barriers
Habitat Data
Barrier Decision Support Tools

- Prioritize Projects
- Most kilometers
- Best Habitat
- Risk for people
- Funding focus area
- Partner capacity
From 1912 to 2019:
1.384 dams removed

2019
- 26 states removed dams
- 90 Dams total
- 1.566+ km of river miles reconnected

Map & Data: American Rivers.org 2019
Maine’s Precedent Setting Dam Removals

- Edwards Dam, Kennebec River, Augusta, Maine, built 1837
- First dam denied Federal Energy permit and required to remove
- Energy production value was compared to large environmental cost
- Atlantic salmon in steep decline
- Active Partnership of NGO
Penobscot River Restoration Begins, June 2012

Largest remaining run of Atlantic salmon in the US
A More Connected Penobscot: May 2016

3.200 km additional accessible habitat
Sheepscot River Dam – Removal and Partial Removal
Site Issues & Considerations

- Local connection/identity
- Swimming place
- Fish Passage-endangered species
- Historical Site
- Fire fighting water supply
- Ownership/Control
- Public Access & Safety
- Debris Maintenance
- Parking site
  - Fishing
  - Boating
  - Commercial fish harvest
Photo of existing Head Tide Dam from downstream, March 2016, MirandaNemeth@Atlantic Salmon Federation
Columbia River Dam, New Jersey, US
Removed 2019

1900’s Ice dam → hydro → obsolete
Paulins Kill River after 110 years
American shad returning by hundreds
Passage at Road Crossings
Ecological Impacts

Recovery of river herring runs Blackman stream portion and total measured Penobscot river.
Social Impacts
Economic Impacts
River Restoration in the US has Taught Us:

• Public & government support is critical for restoration (policy, influence, votes, €s)
• Prioritization is critical to have an impact, and
• Partnerships are needed to bring projects full cycle
• Fish, ecosystems, local economies rebound
• Society benefits tremendously from new river connections
• Good external communicating is crucial!, make sure this is funded (and fun)

What Can You Do To Help:

• Stream Barrier surveys (Barrier Tracker app) and for important habitat
• Connect with local organization, town, watershed association to help
• Help your local NGO agency to host an event.
• Donate your time, money, educate, connect to funders, create excitement
Lessons from Around the World

From Sea to Source 2.0
Protection and restoration of fish migration in rivers worldwide

1,154 free downloads so far
www.fromseatosource.com
Thank you