Shibetsu River Restoration Project

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Restoration Ecology

- Ecology: the branch of biology that deals with the relations of organisms to one another and to their physical surroundings

- Restoration: the action of returning something to a former owner, place, or condition; returning to a normal or healthy condition

- Restoration Ecology: the application of ecological principles and field methodologies to the successful restoration of damaged ecosystems

Land of Natural disasters

Earthquake

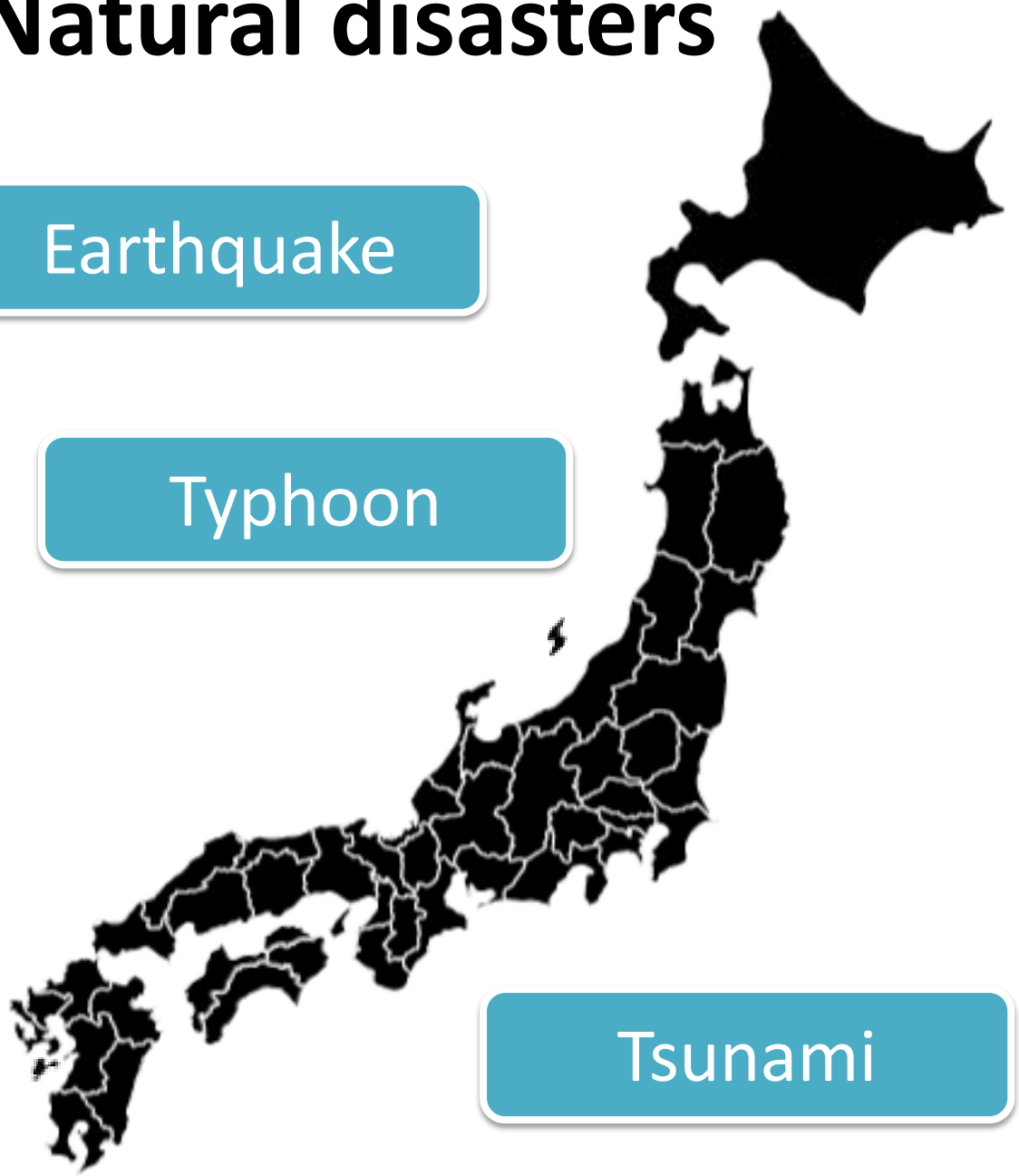
Volcanic eruption

Typhoon

Flooding

Land slide

Tsunami



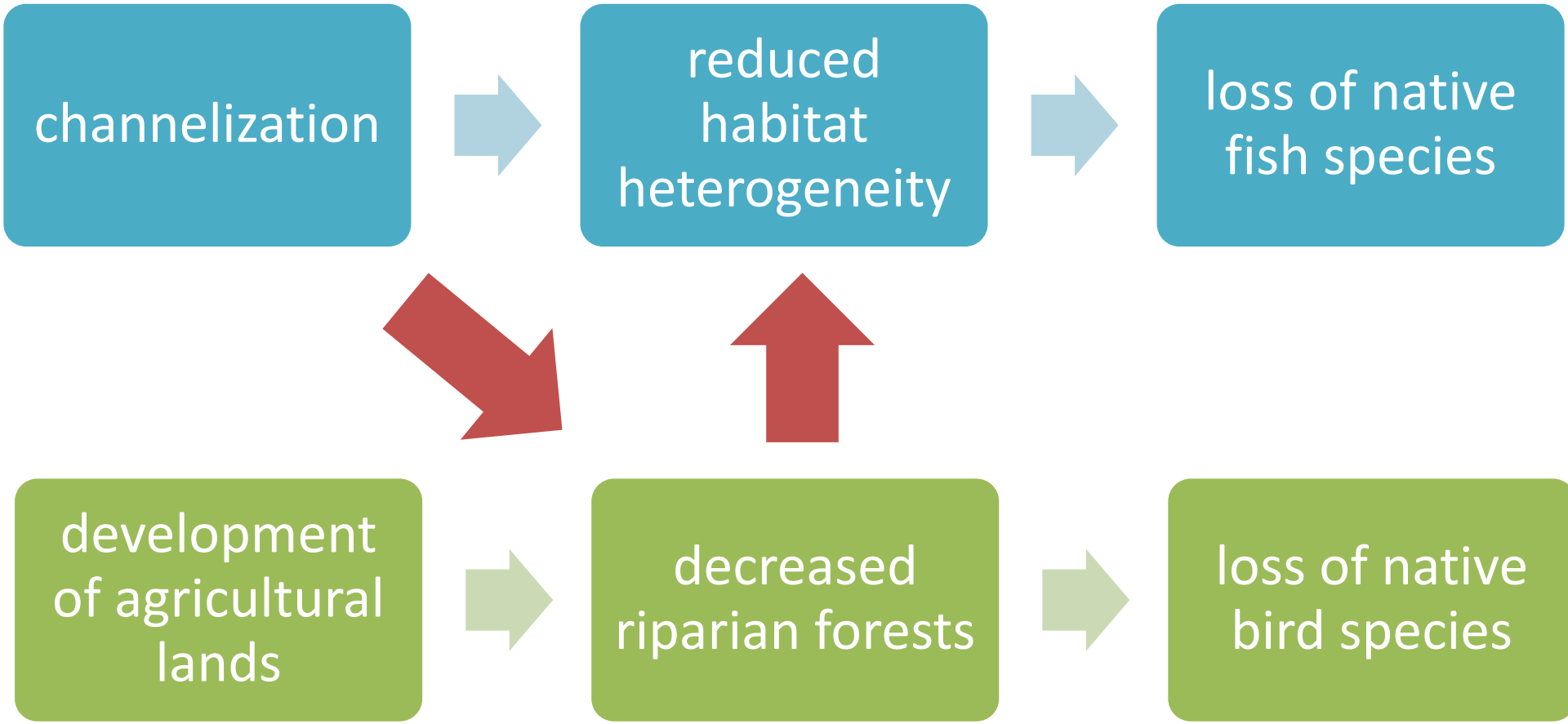
Flood control in Japan

- Short, steep, flashy rivers

This is not a river,
but a cataract

- 1890's
  - channel straightening
- 1980's
  - increasing interest in biodiversity conservation
- 1990's
  - ecological restoration of rivers

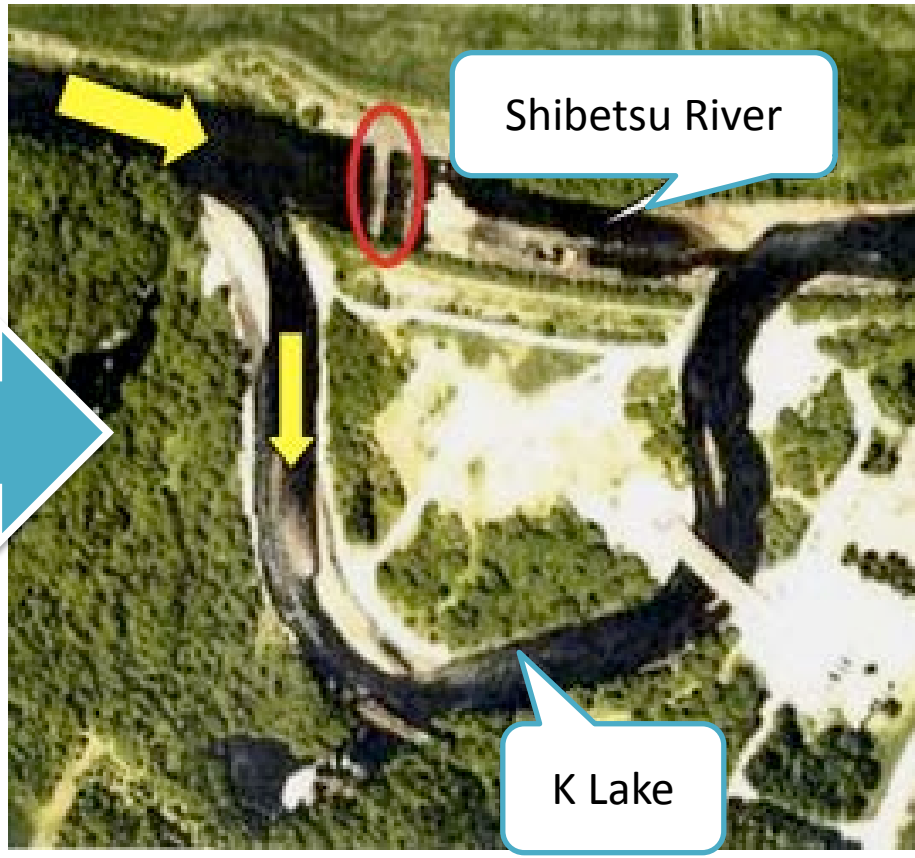
Consequences of Degradation



Pilot Re-meandering Experiment

Before

After



Picture: Knowledge of Stream Ecology Database

Ecological Strategies

- create various in-stream structure
  - depth, velocity, pool-riffle structure
- increase habitat complexity and diversity
- improve biological connectivity
  - salmon upward migration
  - nutrient cycle

Picture: Kitanogurume.com

Assessment of Success

Variable	Results compared to channelized site
Physical Structure	▪ more diverse in meandered site
Primary Production Rate	▪ higher in meandered site
Macroinvertebrate Community	▪ more abundant and diverse (especially in edge)
Fish Community	▪ higher biomass in meandered site ▪ meandering reach is used by salmonoids
Daubenton's bat	▪ more foraging activity in channelized site

Success…?

Variable	Results compared with natural meander/oxbow lake
Physical Structure	▪ higher overall velocity than natural meander
Primary Production Rate	
Macroinvertebrate Community	▪ species existed in K lake were lost
Fish Community	▪ change in composition from lentic to lotic ▪ did not use meander as a holding habitat
Daubenton's bats	▪ found more in channelized reach due to the developed riparian forest

Future Outlook

- Physical structure is likely to develop closer to natural meandering
- Riparian vegetation is likely to develop
- Most of the still water species will not recover

Picture: Knowledge of Stream Ecology Database

What could be done differently

- reduce impact to old-growth riparian forest
- conserve rare species in oxbow lakes

Planning restoration on landscape level