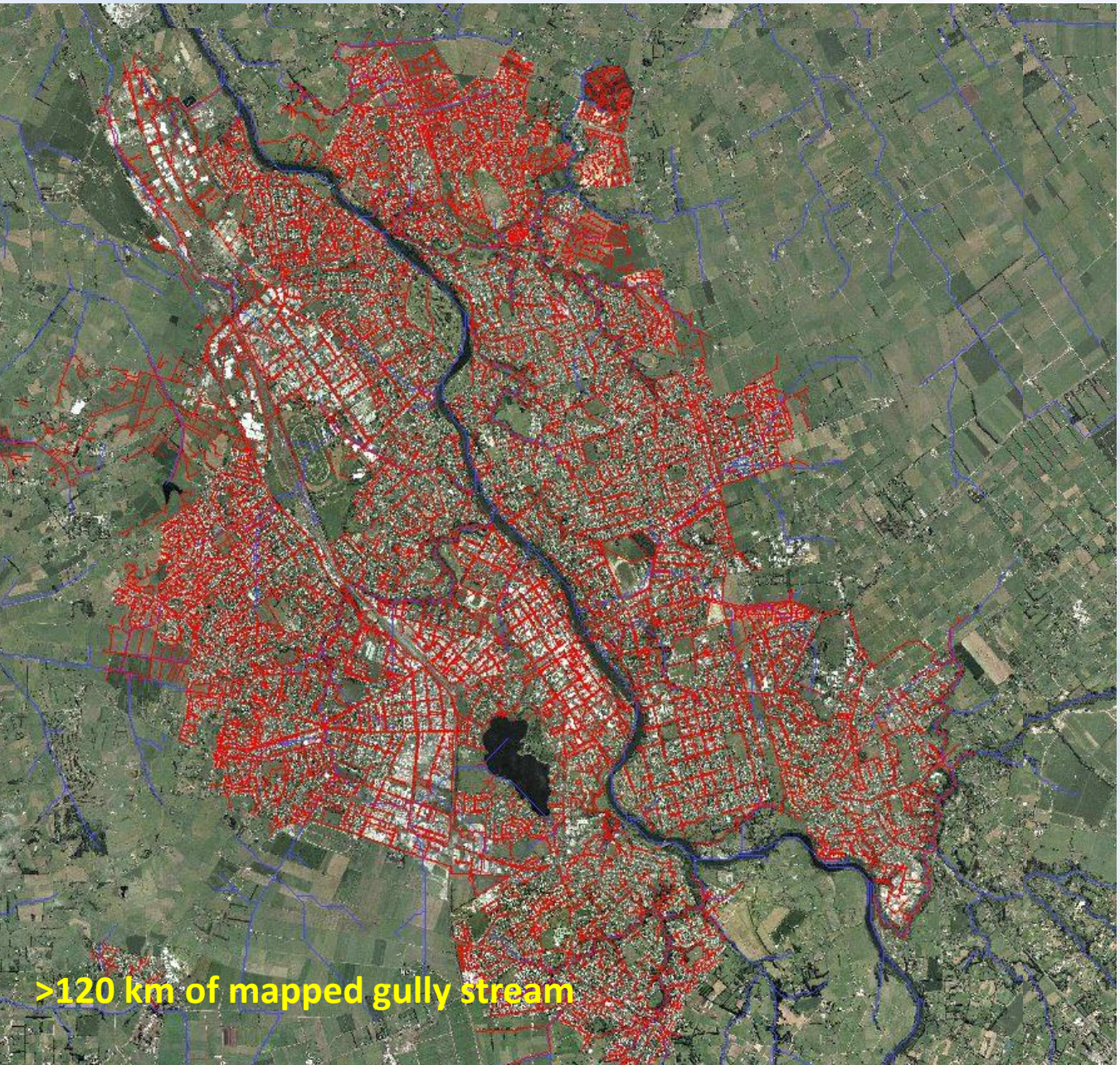
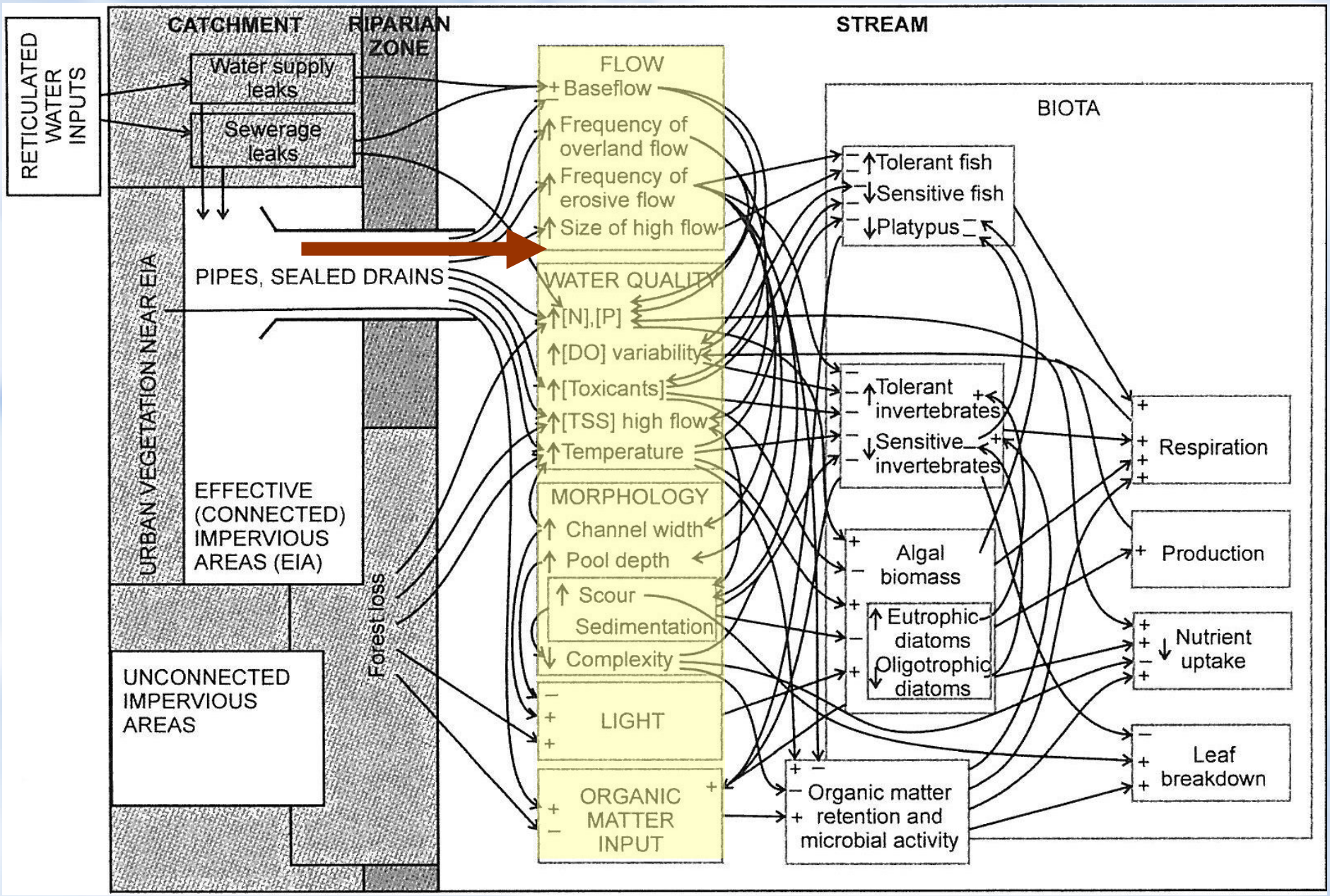
Stream restoration in Hamilton City: Mission Impossible?

Cities are where most people interact with biodiversity most often

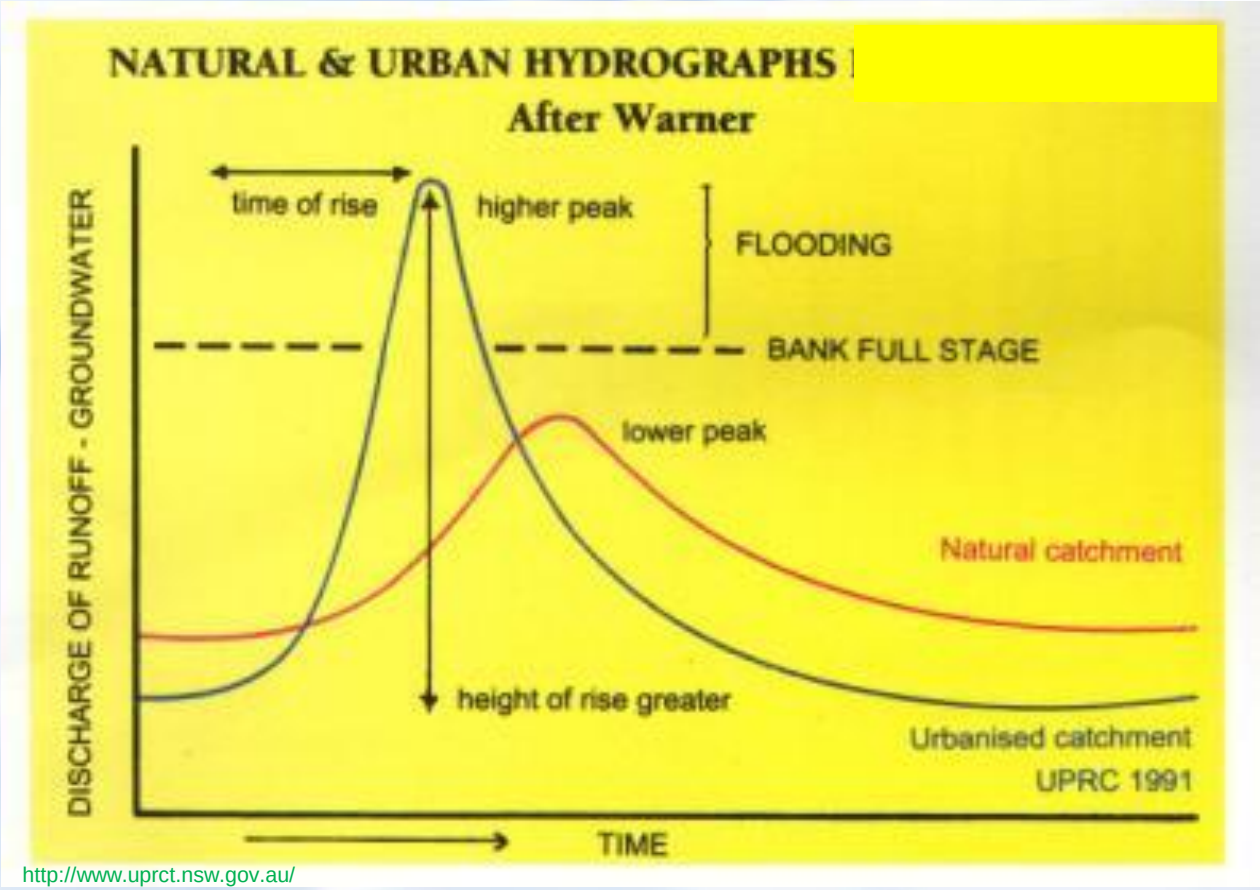
Hamilton City streams





Impacts are complex – multiple stressors

Effects of stormwater on hydrology



Flashier flows & bigger floods

More bank erosion

More sedimentation

Warmer water temperatures

Higher levels of contaminants

Storm runoff can occur 10 times more often

Typical large floods can occur 3 times more often

Temperatures can be around 6^{o}C warmer

Historical legacies…

…such as old landfills

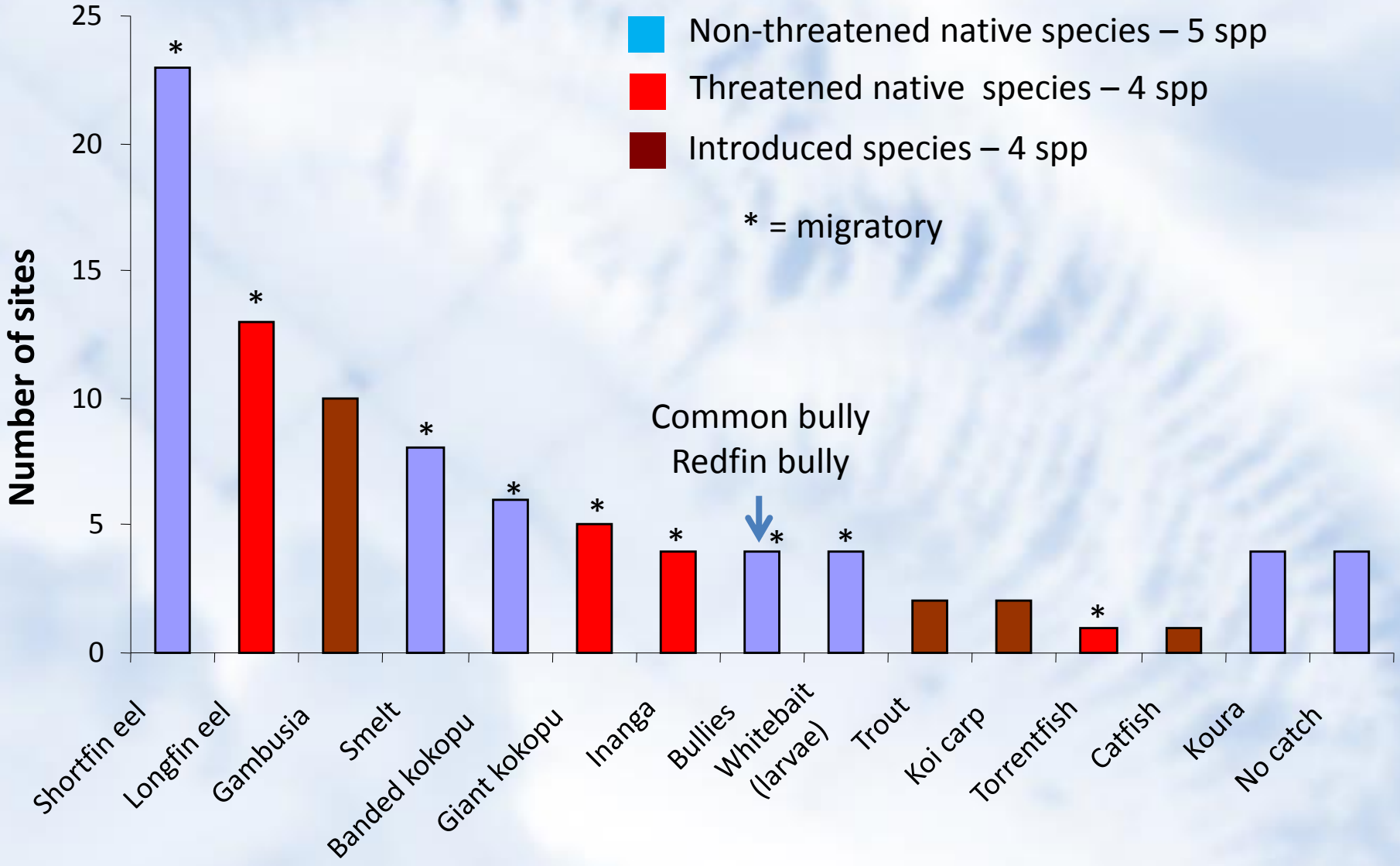
Urban intensification and periurban development…

…sediment inputs


Channelisation…
…accelerates drainage
…homogenises habitat


Barriers to fish passage
45% of culverts can be
barriers to native fish movement
in Hamilton City…

Fish in Hamilton streams



Pest fish…

- Catfish
- Gambusia
- Koi carp

Numbers typically low in city streams


Longfin eel
THREATENED
animal.discovery.com

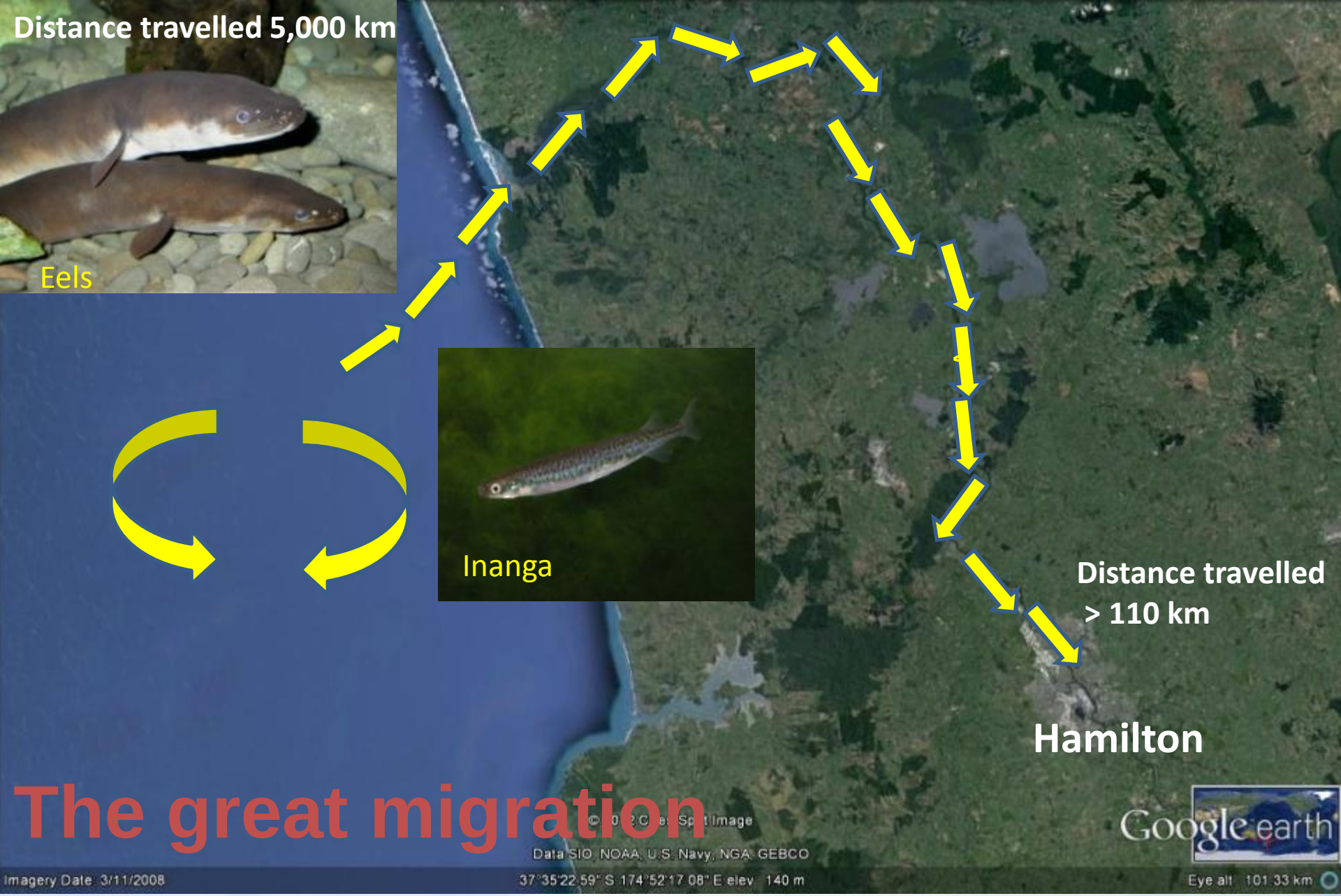
Giant kokopu

THREATENED

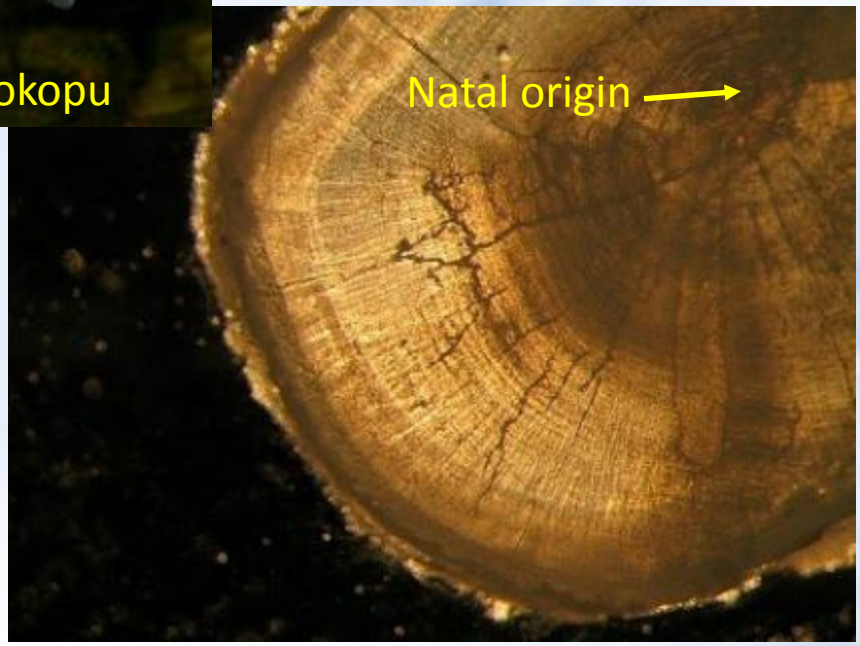

Torrentfish
THREATENED

Inanga - whitebait

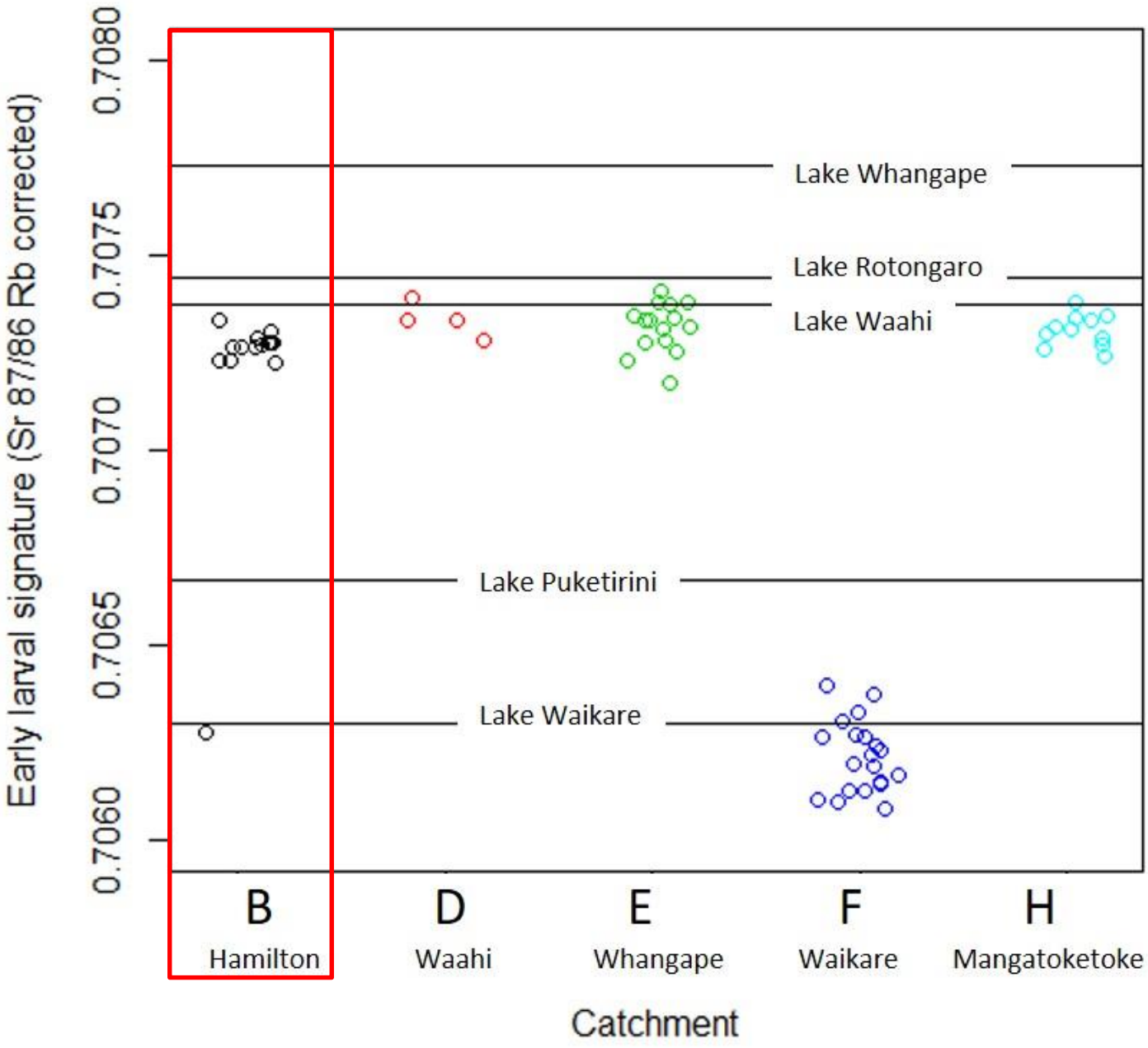
THREATENED


Distance travelled 5,000 km
Eels
Inanga
Distance travelled
> 110 km
Hamilton
The great migration
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Imagery Date: 3/11/2008
37°35'22.59" S 174°52'17.08" E elev 140 m
Eye alt 101.33 km


Banded kokopu

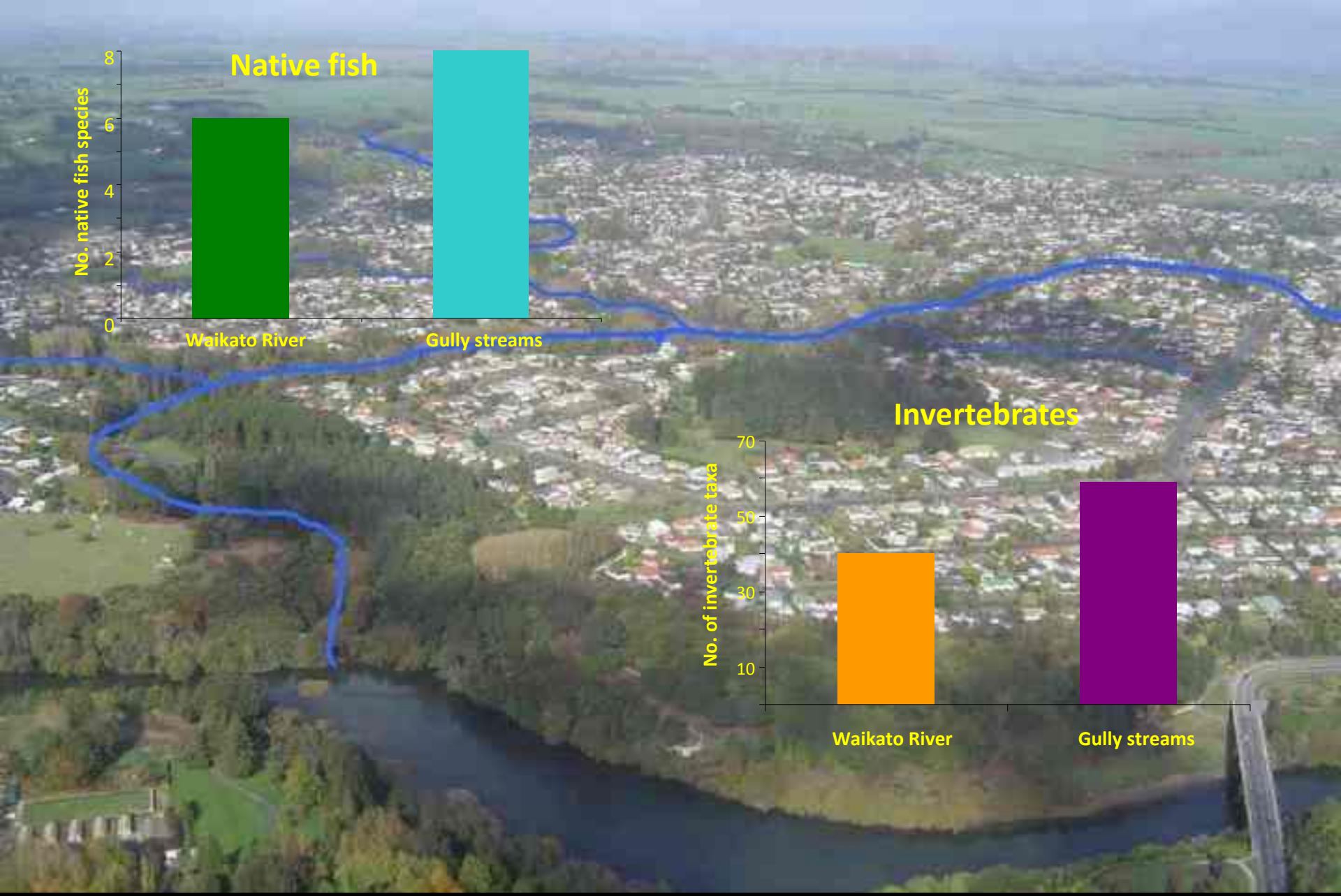

Natal origin

Banded kokopu



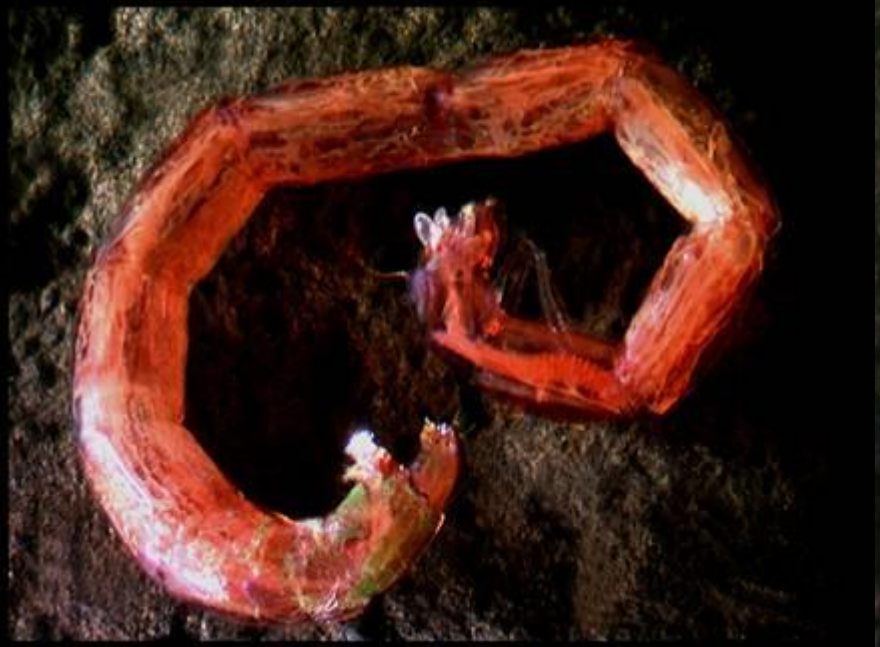
Source: B. David, Waikato Regional Council

To restore kokopu populations in city streams need to manage natal habitats in riverine lakes



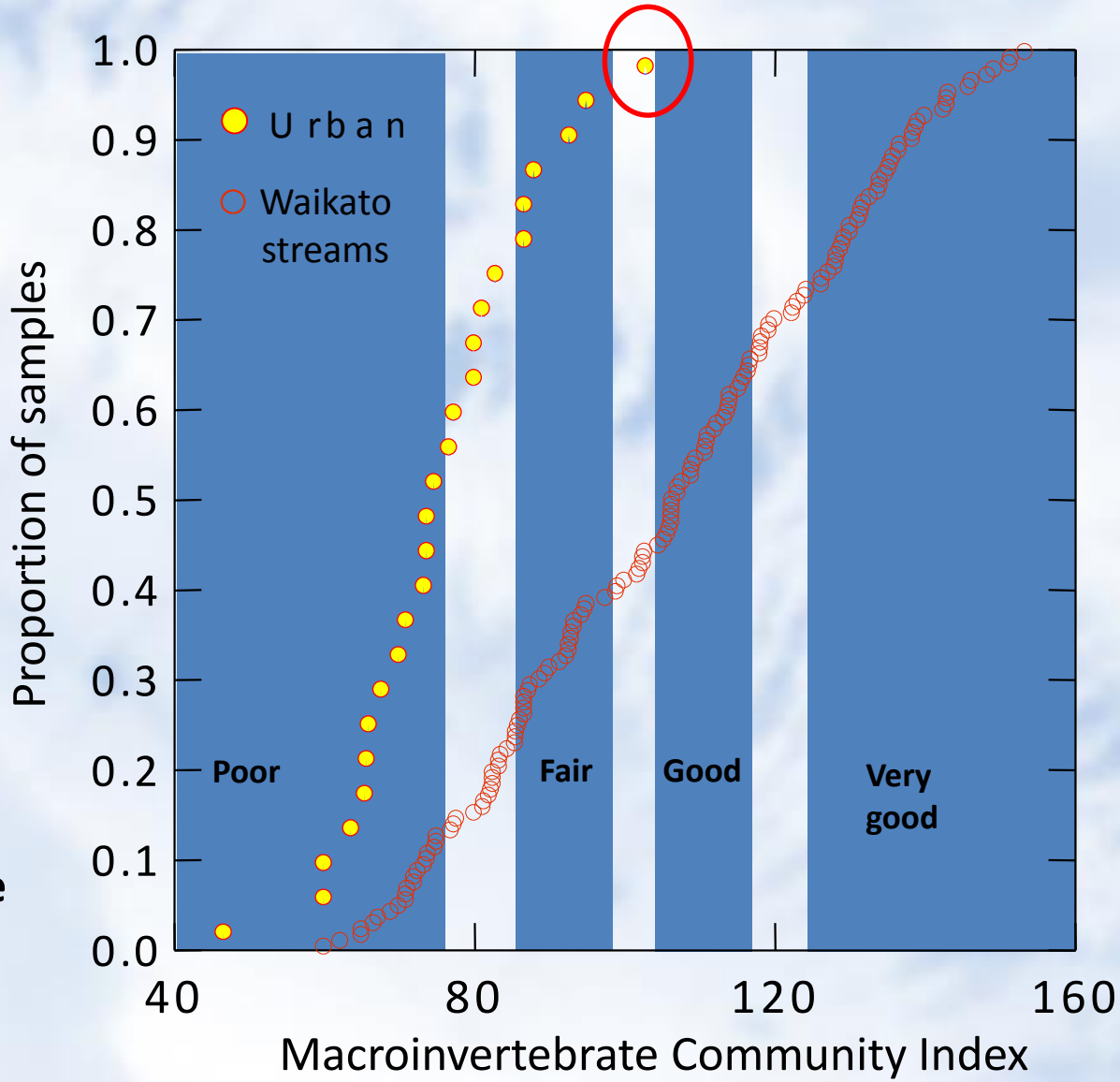
Urban gully streams are important for biodiversity

Tolerant invertebrates



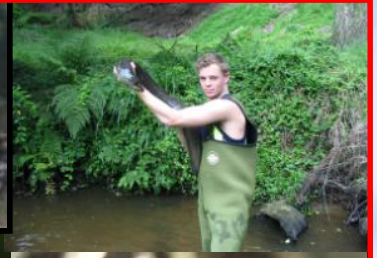
Sensitive invertebrates

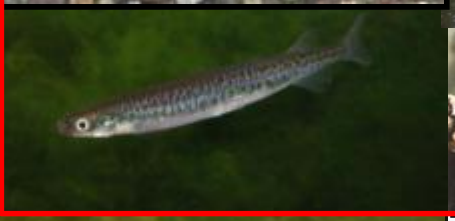
Macroinvertebrate Stream Health Index



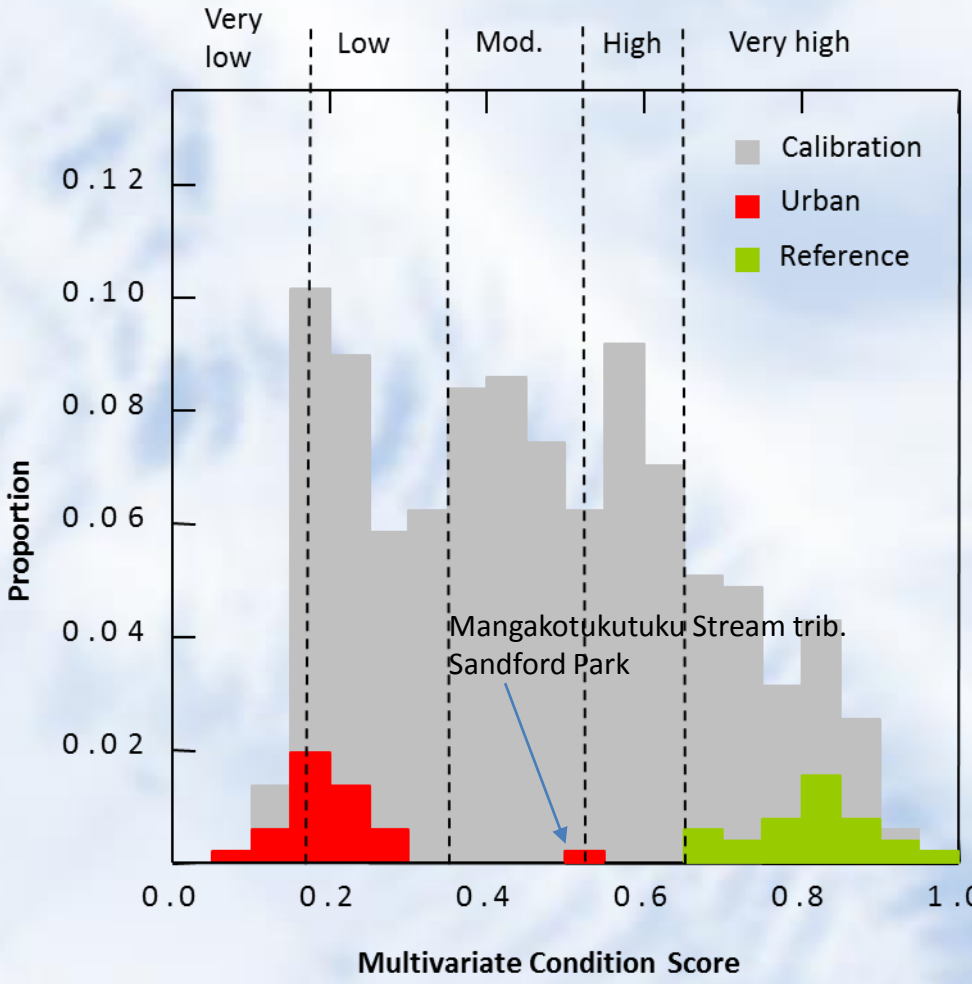
Most urban streams are in "poor" condition, but some sites are "fair" or better

First step is to protect remaining good sites

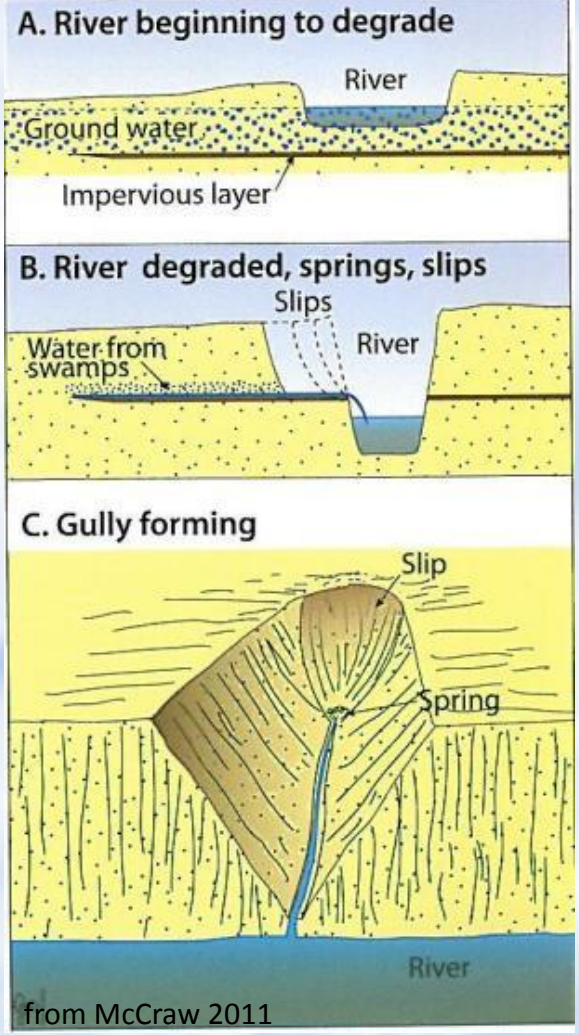





Female Redfinned Bully



Opportunities for restoration…
Protect keys habitats



from McCraw 2011

…disconnected from stormwater network

…30% of mayfly and caddisfly species in city

…uncommon, iconic, even new invertebrates

Opportunities for restoration…
Improve water quality

Landowners:

- Keep chemicals out of drain
- Clean cars on the grass
- Keep rubbish out of gully/stream
- Paint zincalum roofs
- Disconnect downpipes if roof-cleaning etc

Councils:

- Raise public awareness
- Stormwater treatment
  - sump filters
  - detain, infiltrate, evaporate
- Greenfield developments vs. established residential areas

Opportunities for restoration…
Riparian planting

Opportunities for restoration…

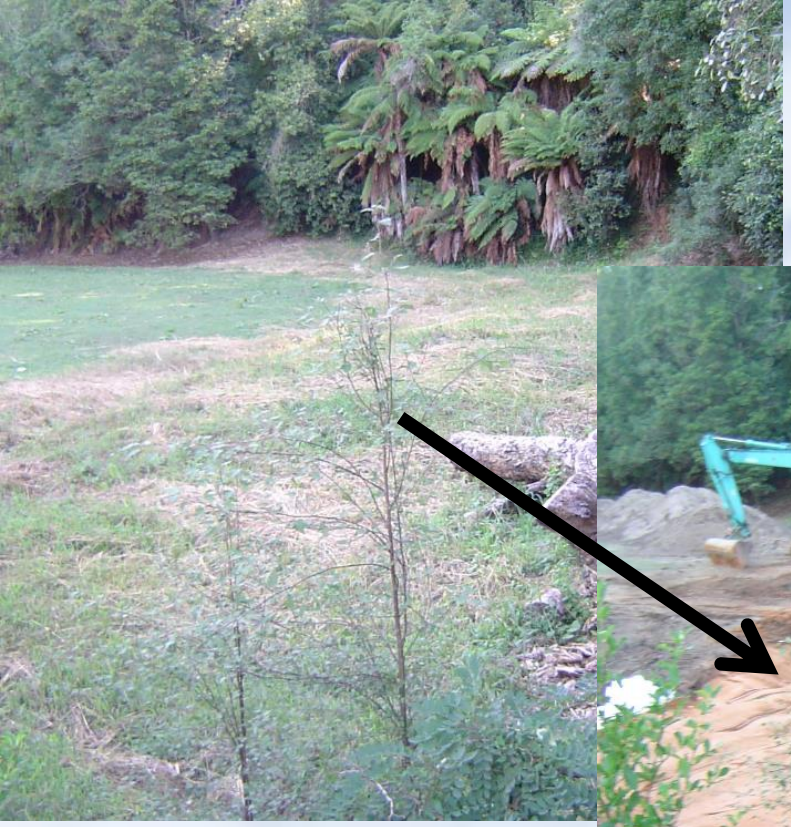
Enhance instream habitat

Tuna townhouses

Kokopu condo

Wetland creation for mudfish

Before

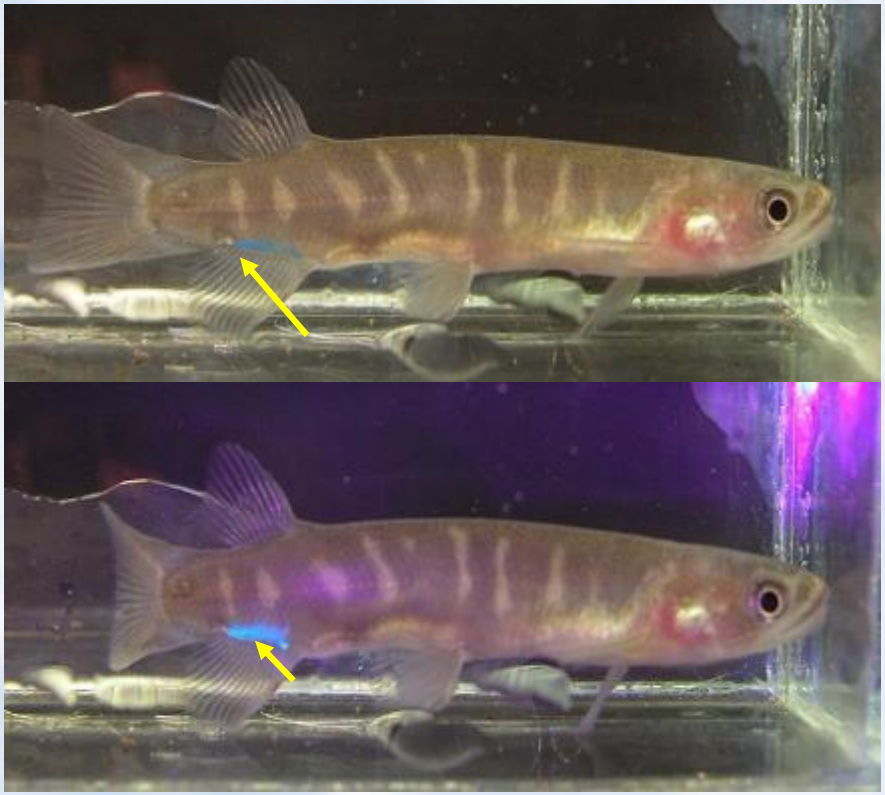


During

After

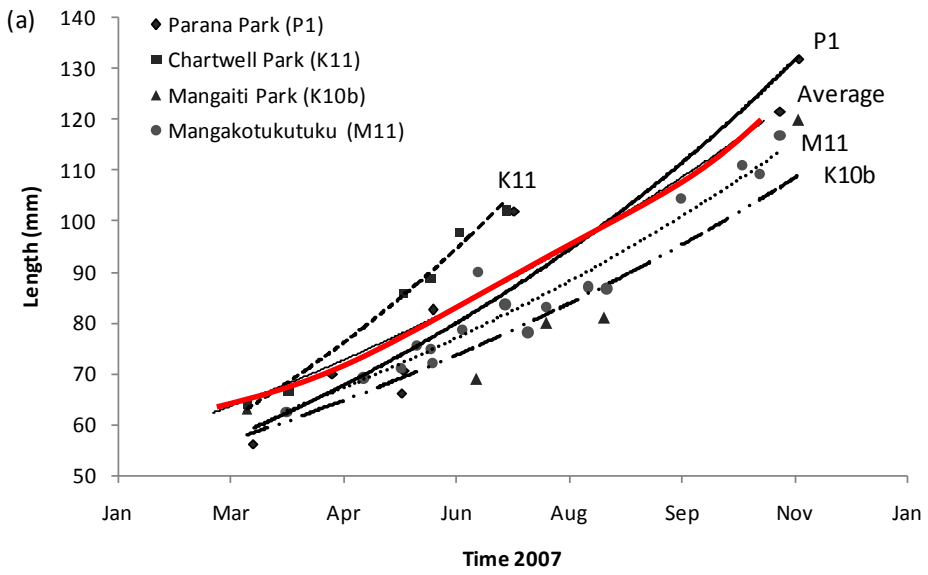
Opportunities for restoration…

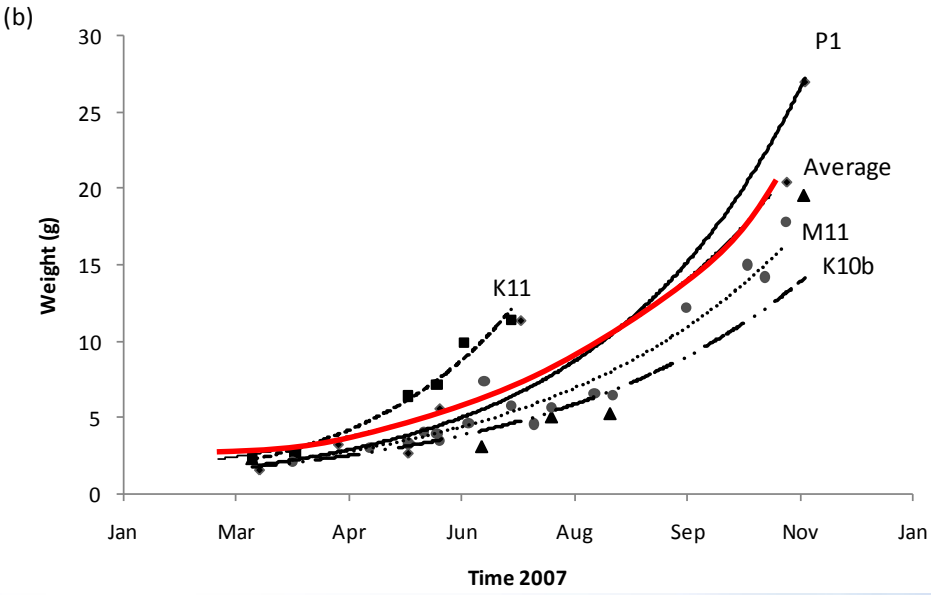
Re-introduce fish



Giant kokopu

Evidence to suggest pheromones needed to attract new recruits





Opportunities for restoration…
Passage and connectivity

Fish passes in Hamilton…

Fish pass construction – Peacockes Rd

Before

During

After

Inexpensive solution to provide passage for banded kokopu

Opportunities for restoration…
Exclude pest fish

Photo: Bruno David

Photo: John Gumbley

MANGAKOTUKUTUKU STREAM CARE GROUP

www.streamcare.org.nz