


“Putting back the river”: restoring floodplains in the Syilx Okanagan Territory

Natasha Lukey, Okanagan Nation Alliance
Nlukey@syilx.org
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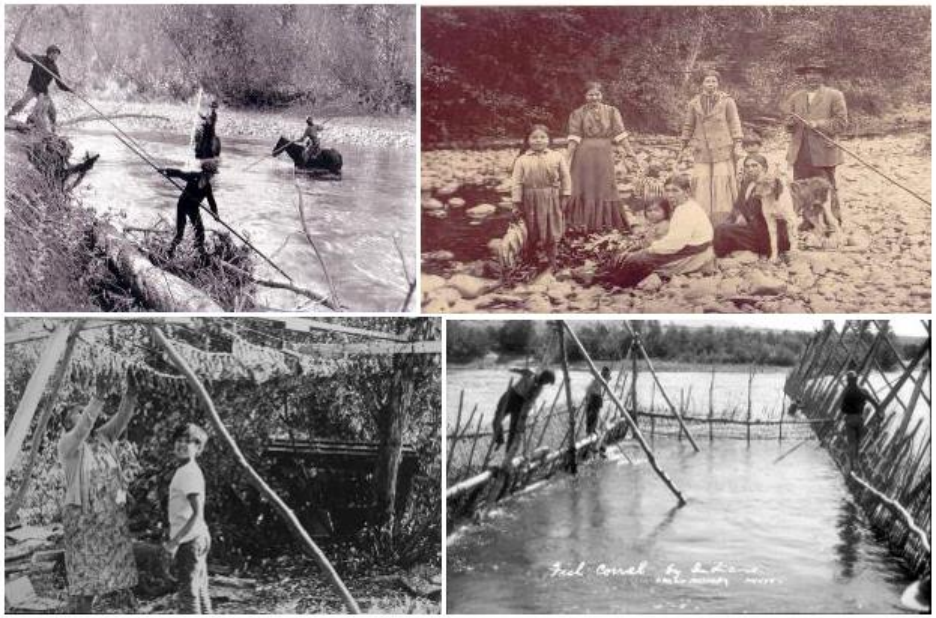
Okanagan Nation Alliance

- **8 member communities**
- **Mandate:** work collectively to advance and assert Okanagan nation Title and Rights over the Okanagan Nation Territory.



Fisheries Department

Goal and mandate:

The conservation, protection, restoration, and enhancement of indigenous fisheries (anadromous and resident) and aquatic resources within Okanagan Nation Territory

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(*we will cause it to come back)*
Balancing indigenous and western science to manage, protect and restore indigenous fisheries resources and aquatic habitat with the Okanagan Territory

PUT BACK THE RIVER; PUT BACK THE FISH

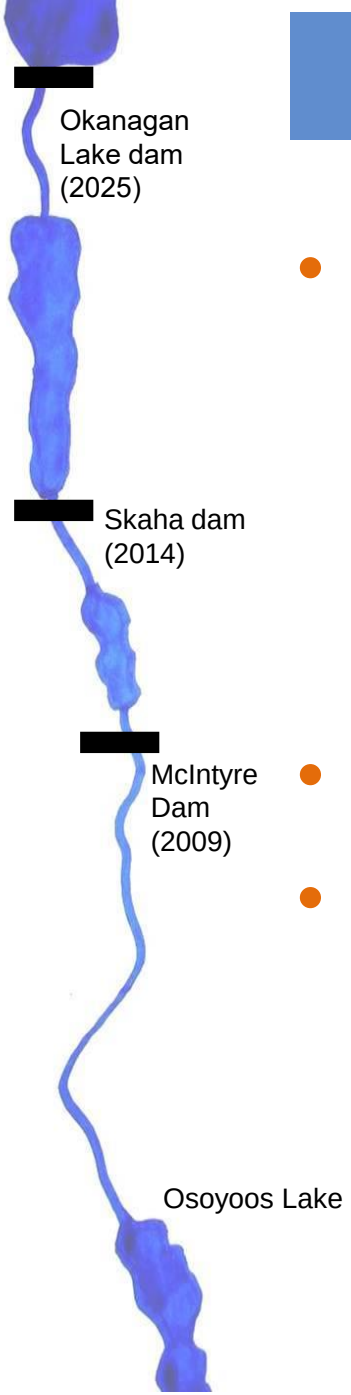
captikʷɬ

People

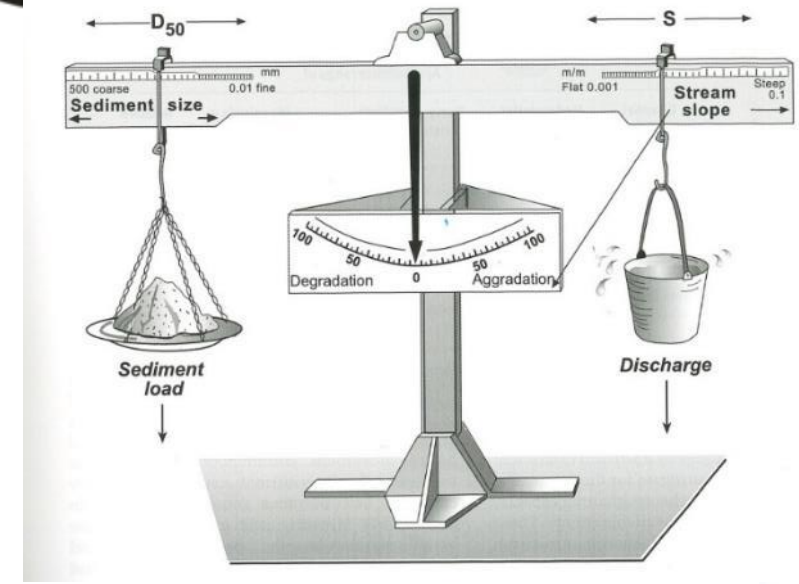
Responsibility

Guiding Concepts

- **Captikʷɬ**
  - How snklip brought the salmon
  - Relationships:
    - chinook <-> cottonwoods <-> sediment <-> inverts
- **Follow today's fish: passage restoration**
- **Alluvial river form & process theory**
  - Newbury, Wolman, Schumm, etc

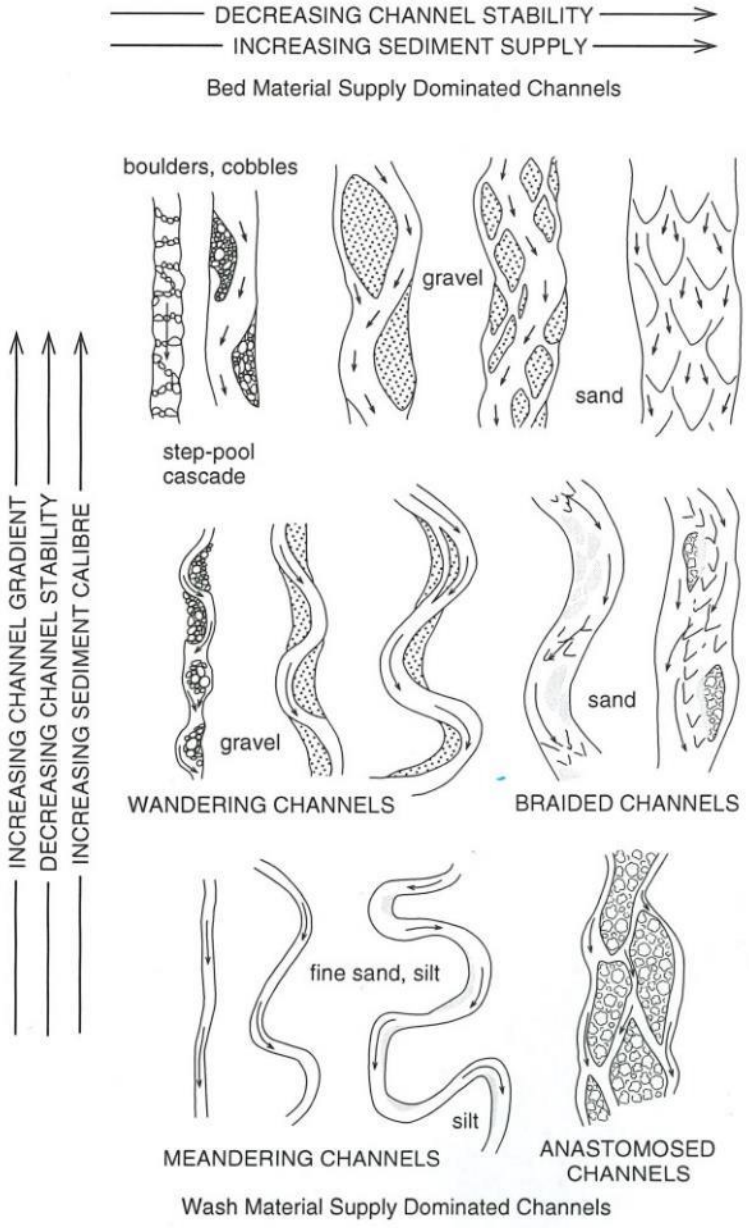


Guiding Concepts – Alluvial River Form



Patterns in river forms are typically due to river processes

- Slope or gradient and discharge
- Sediment supply and types

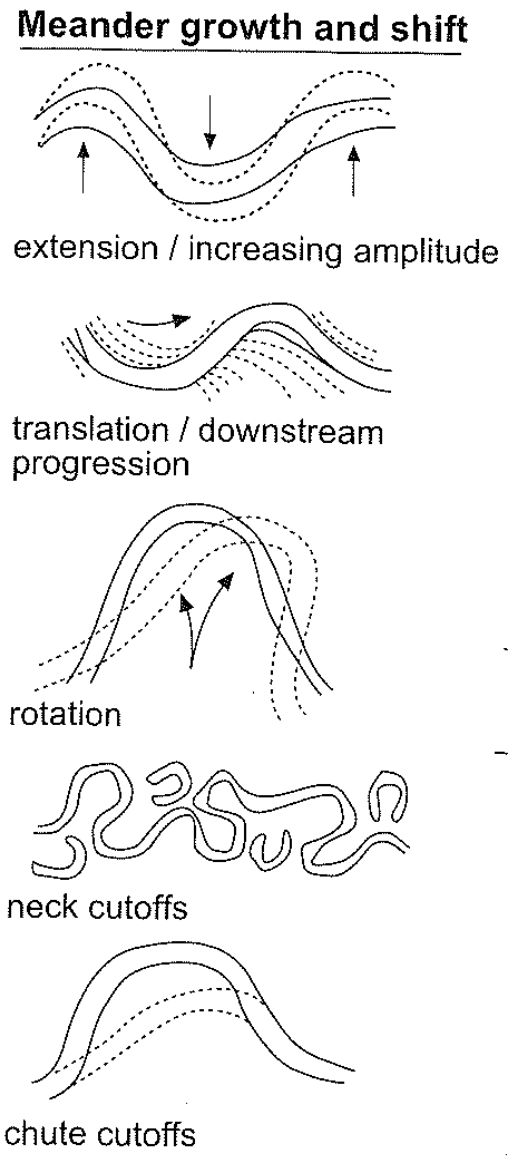


Church 1992 - Channel morphology and typology

Guiding Concepts – Alluvial River Form

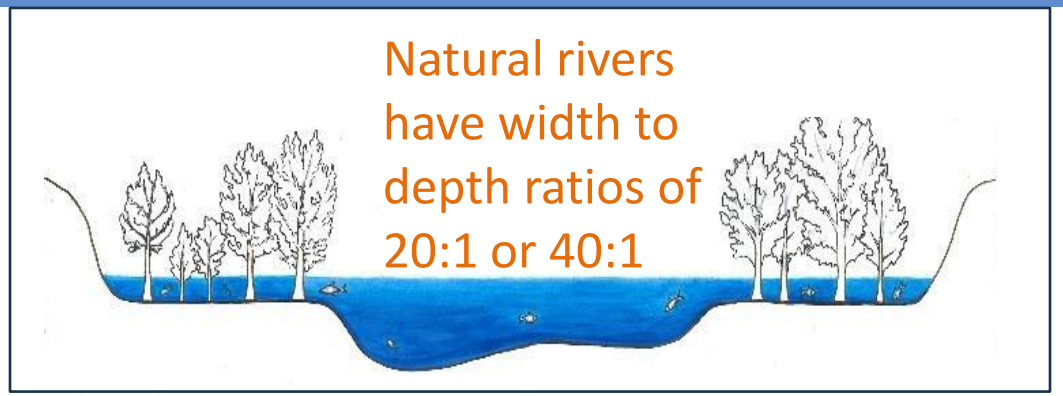
Rivers have a stable rate of change and radius of curvature (Rc)

Meander bends are a function of the ratio between the radius of curvature (r_c) and the channel width (W)

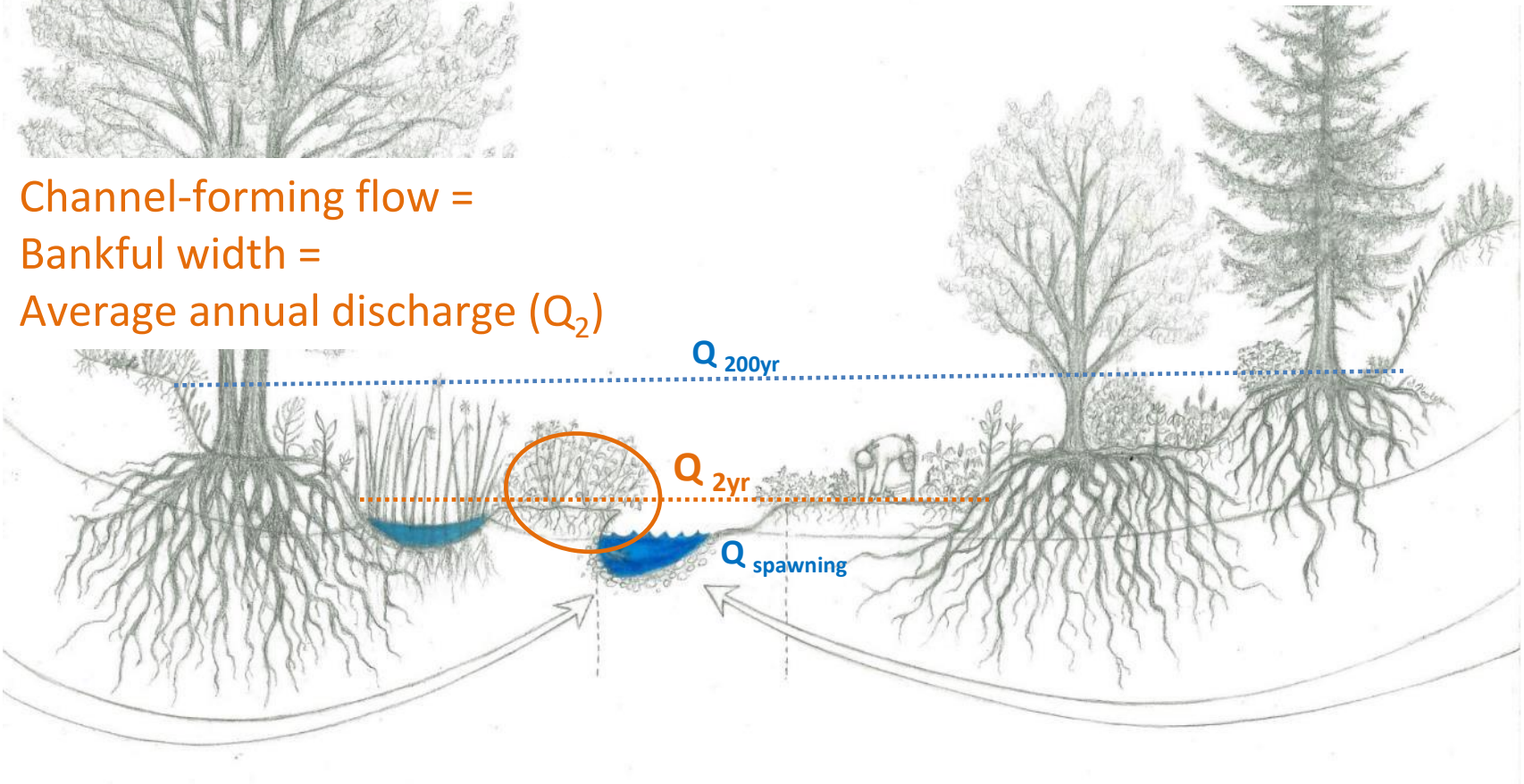


Hickin and Nanson 1975

Guiding Concepts – Alluvial River Form

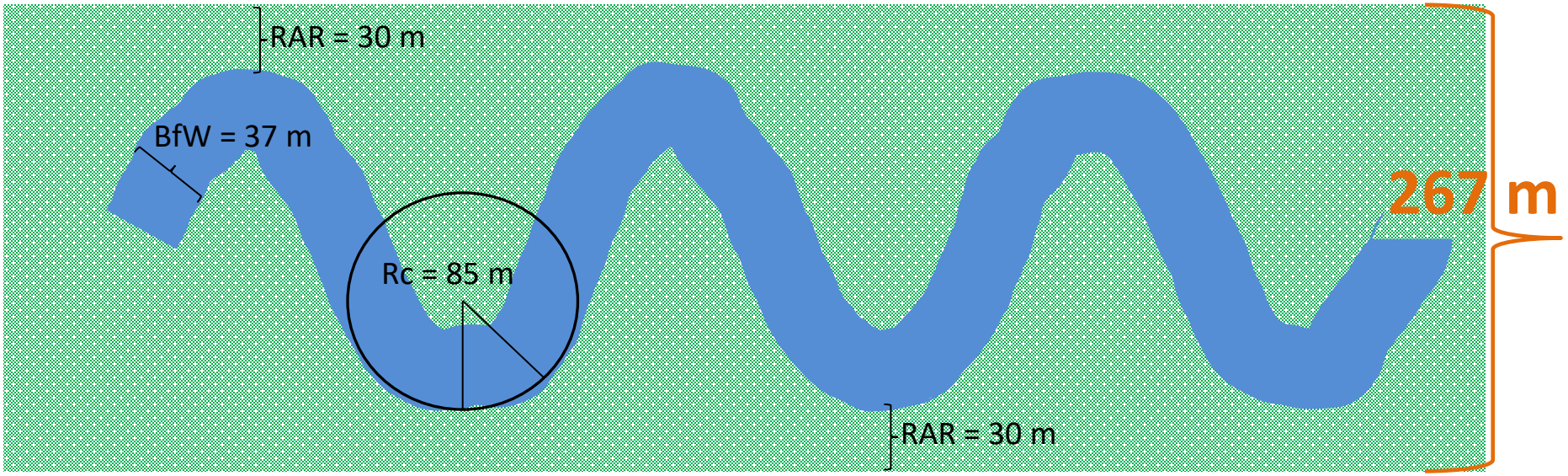


Channel-forming flow =
Bankful width =
Average annual discharge (Q_2)



Put it all together – Belt Width

ex. nx̌ʷaqʷaʔstn (Mission Creek)

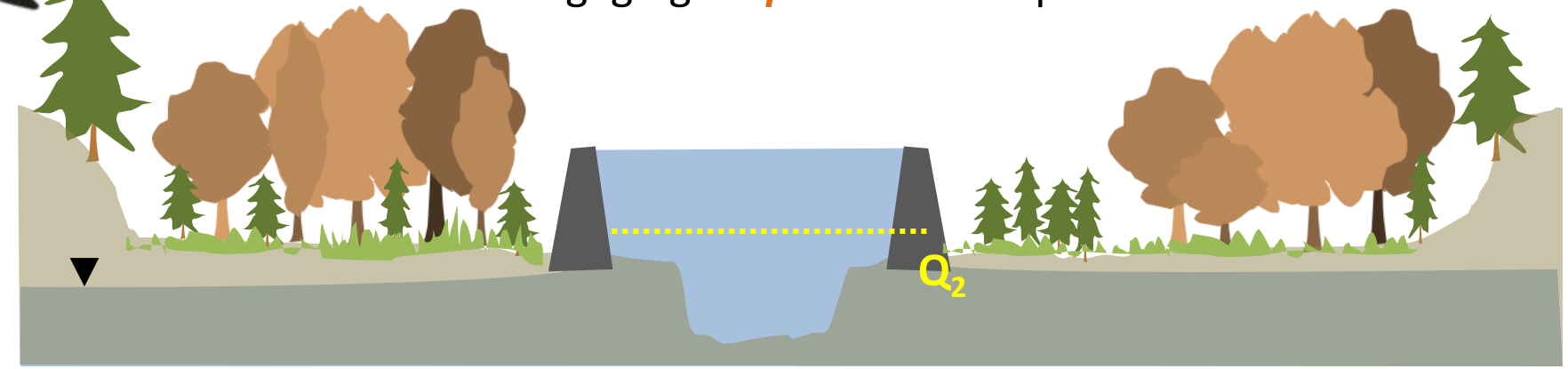


Belt Width	=	Riparian Area (30 m)	+	Radius of curvature (85 m)	+	Bankfull Width (37 m)	+	Radius of curvature (85 m)	+	Riparian Area (30 m)	= 267 m

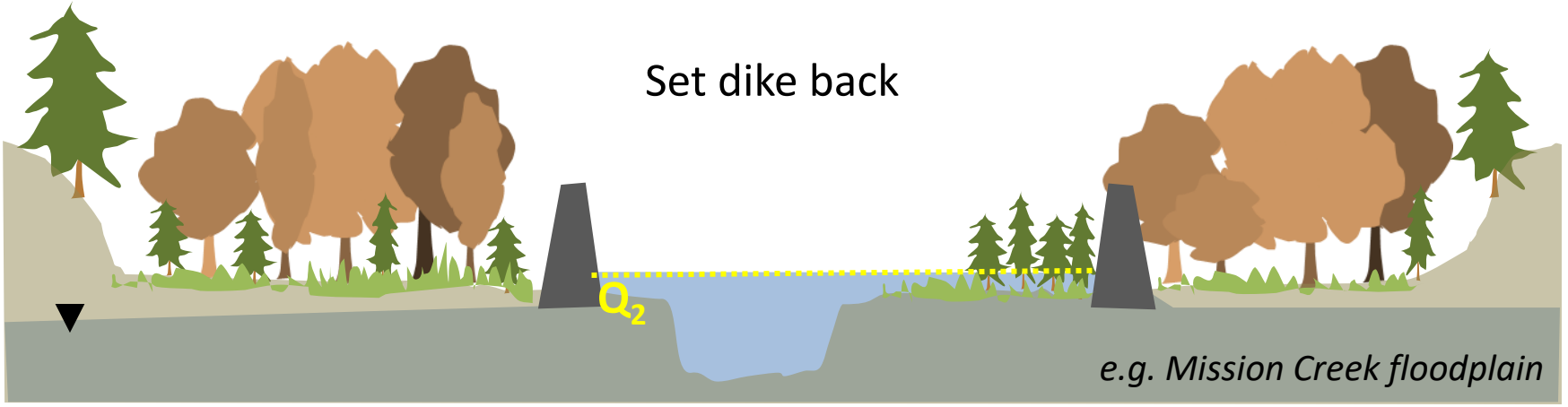
**method adapted from Parish (2004)*

Aligning Hydraulics

Re-engaging ***un-perched*** floodplain



Set dike back



e.g. Mission Creek floodplain

Mission Creek, Kelowna

Dry, disconnected
UNPERCHED floodplain

Straightened,
simplified channel

Mission Creek, Kelowna

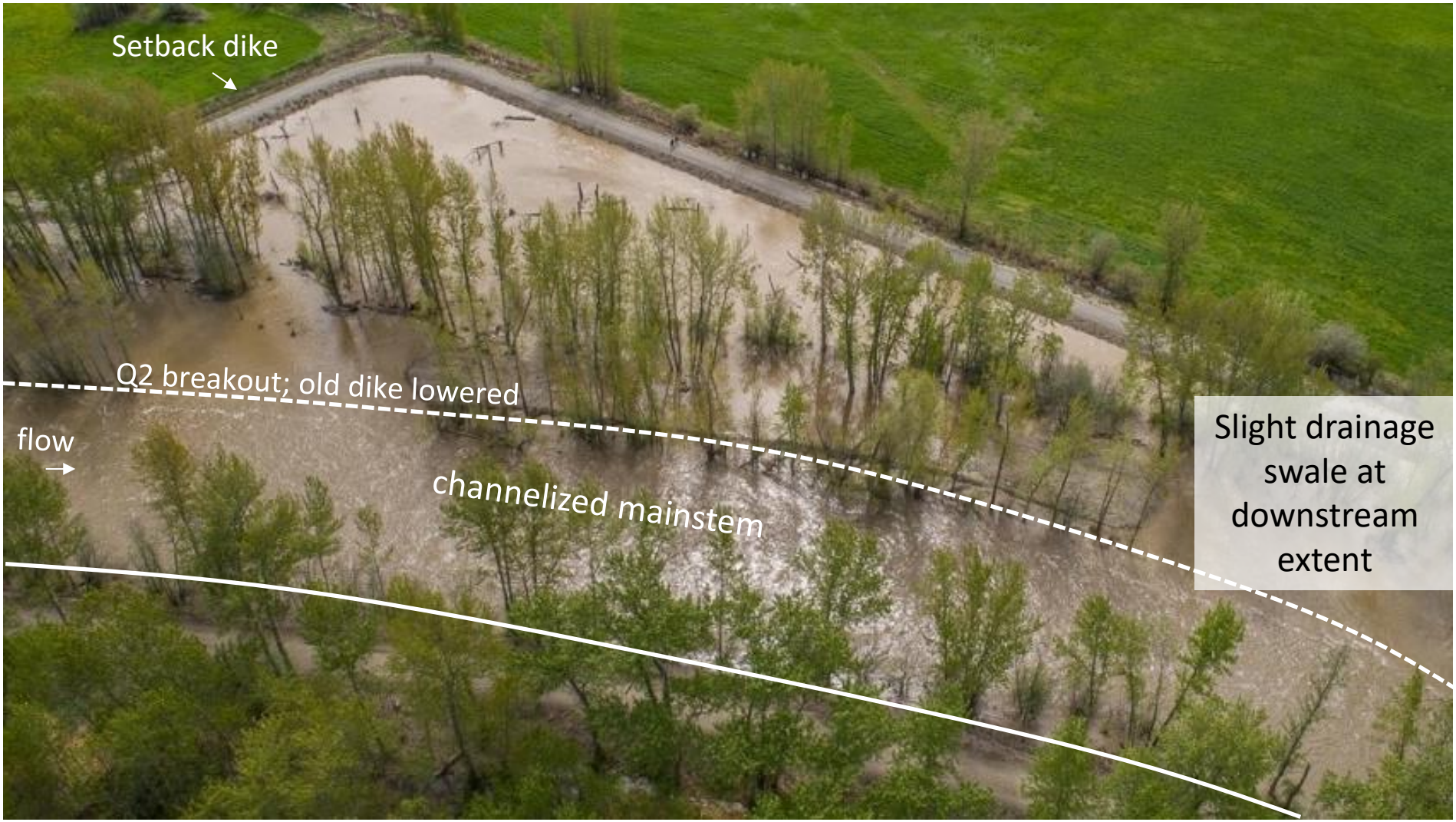
Mission Creek floodplain restoration

THE DESIGN

- Dike setback
- Add woody debris
- Restore riparian vegetation
- Added drainage swales after

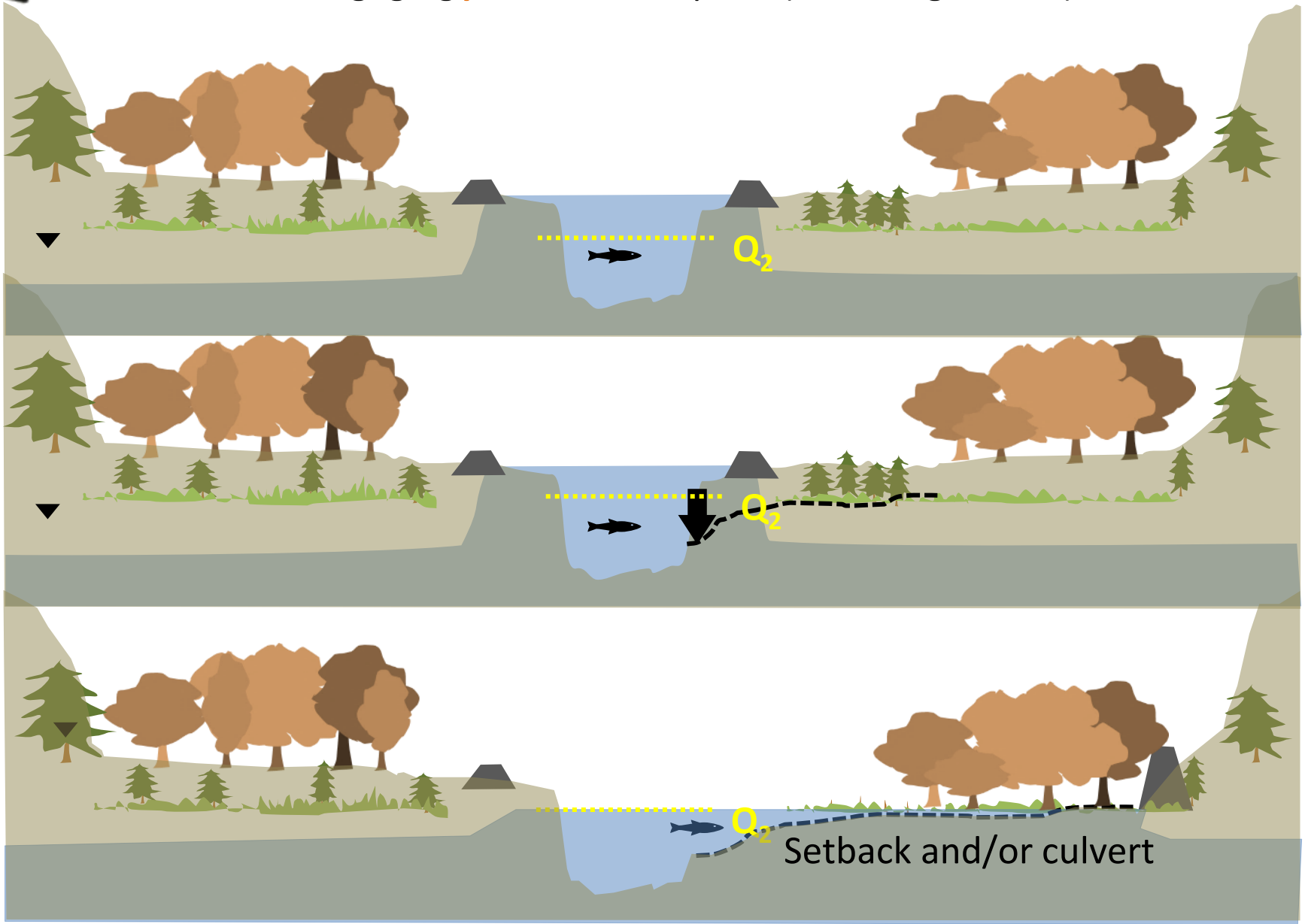
Mission Creek, Kelowna

Dike setback to reconnect floodplain (no digging to new Q_2 depth)



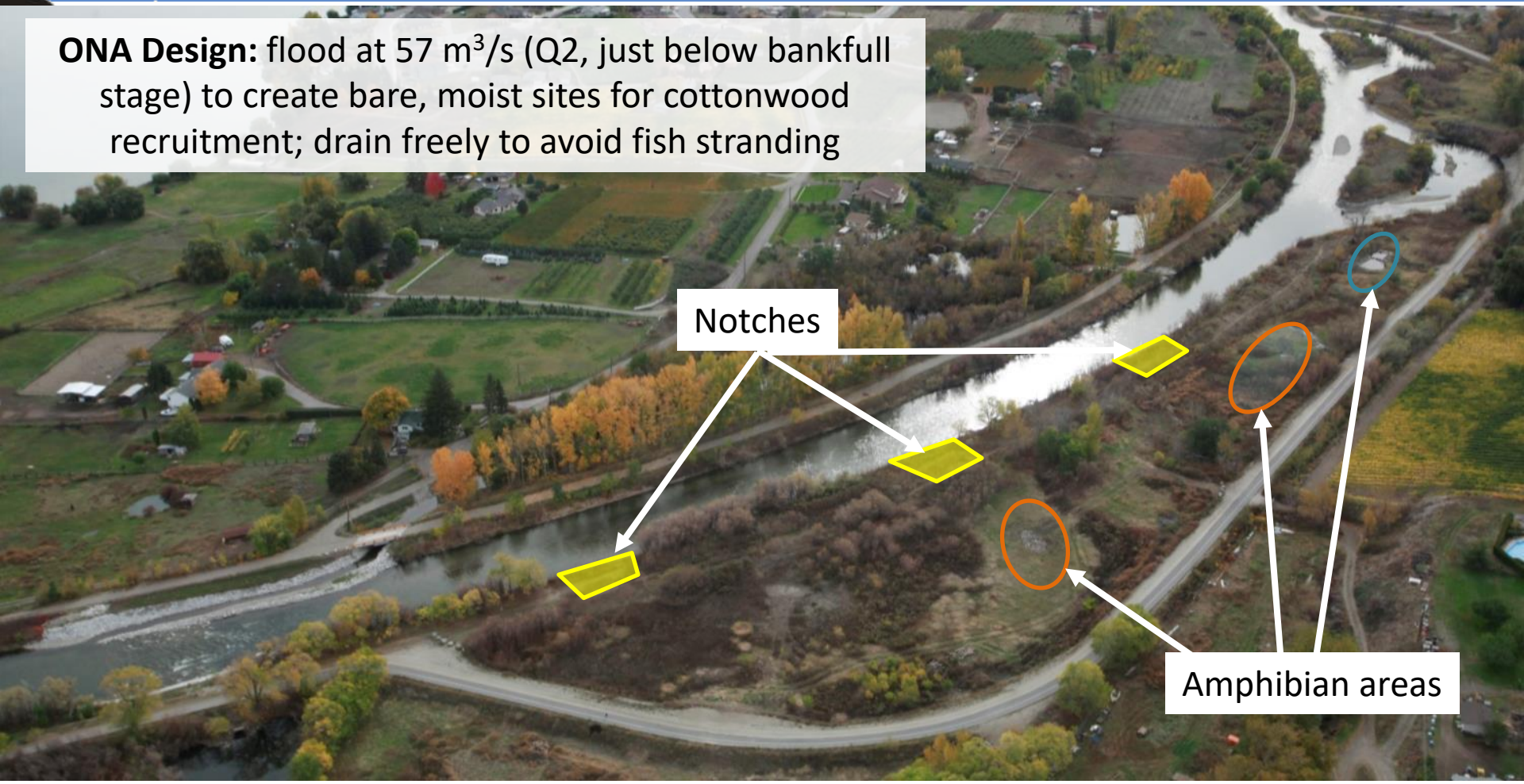
Aligning Hydraulics

Re-engaging ***perched*** floodplain (ex. dredged dike)

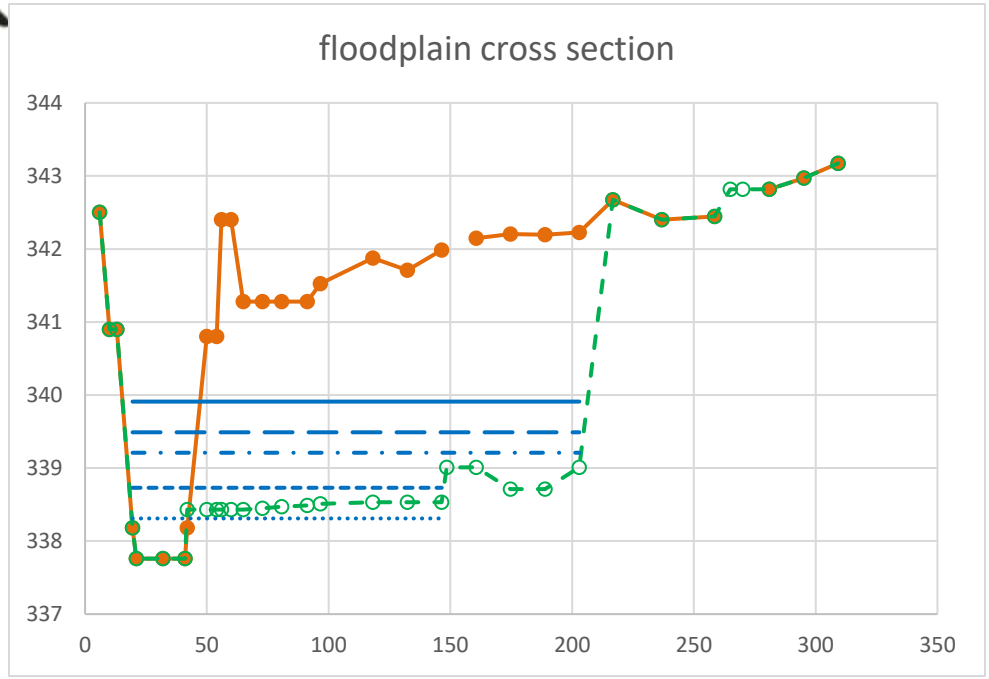


ORRI – dike set back

ONA Design: flood at 57 m^3/s (Q2, just below bankfull stage) to create bare, moist sites for cottonwood recruitment; drain freely to avoid fish stranding



k'əmcənitkʷ FLOODPLAIN

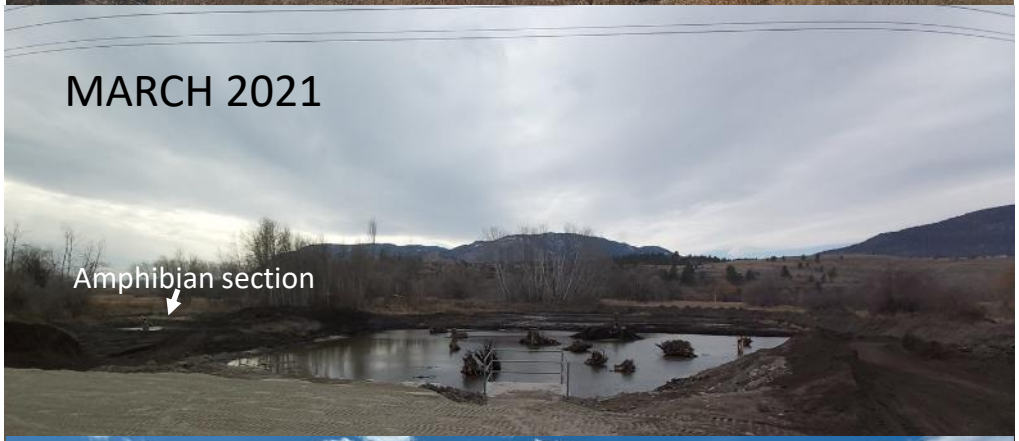


- New bed engaged
- Summer Low flow 8 m^3/s
- Chinook needs 20 m^3/s
- Q_{2yr} 45 m^3/s
- Average High flows 60 m^3/s
- Q_{200yr} flows 97 m^3/s
- Before ground elevation

THE DESIGN

- Engaged at average flows of 20-25 m^3/s with 20 cm lowest depth during engagement
- 40-50 cm at average 2 year (freshet) flows
- 120 cm max depth
- Backwater flow
- 3:1 banks slope for overhanging vegetation
- ~ 10 LWD structures on top of gravel substrate

k’əmcnitkʷ FLOODPLAIN

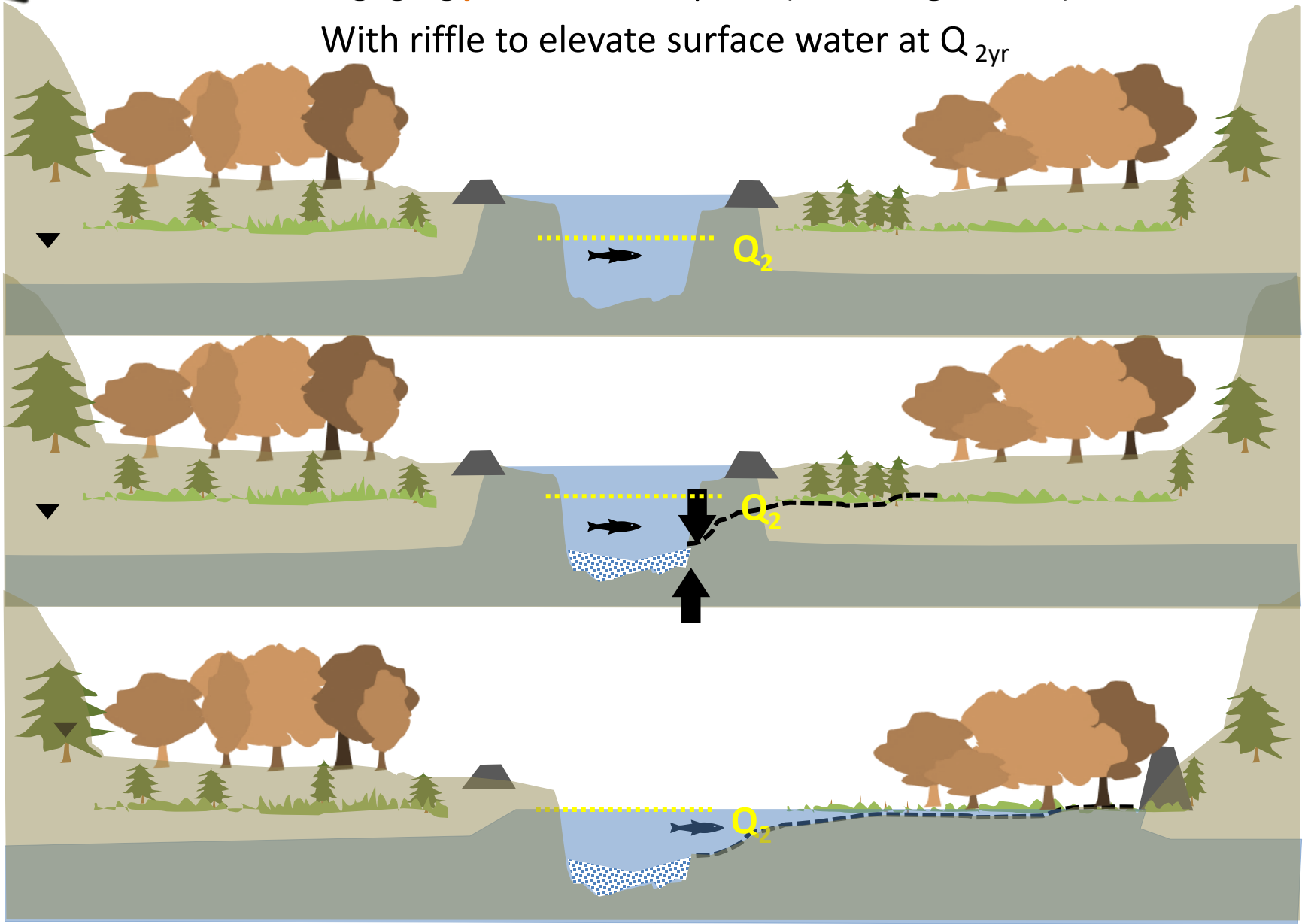


k’əmcnitkʷ FLOODPLAIN

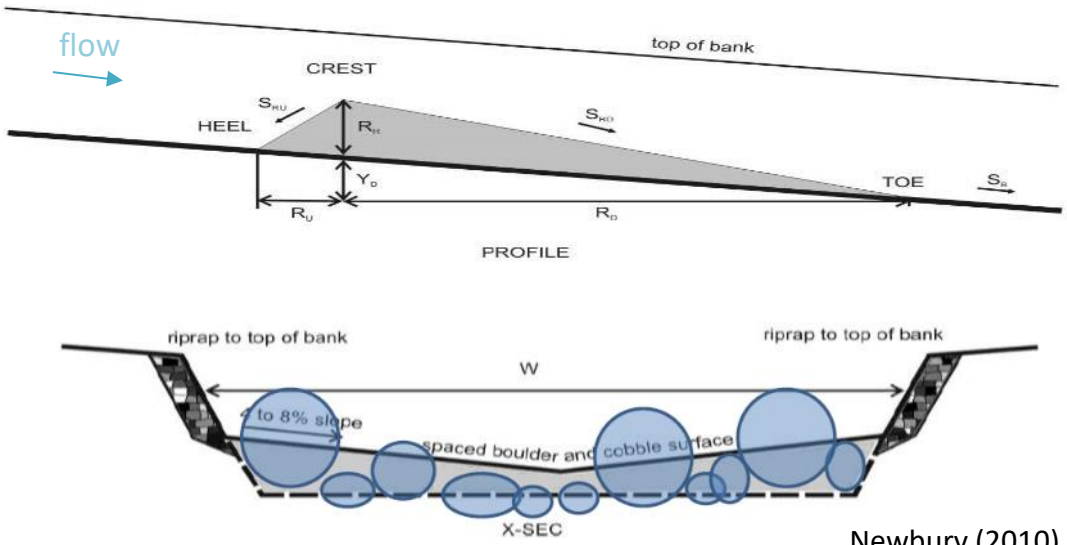
Aligning Hydraulics

Re-engaging ***perched*** floodplain (ex. dredged dike)

With riffle to elevate surface water at Q_{2yr}



Newbury Riffle to elevate SWE



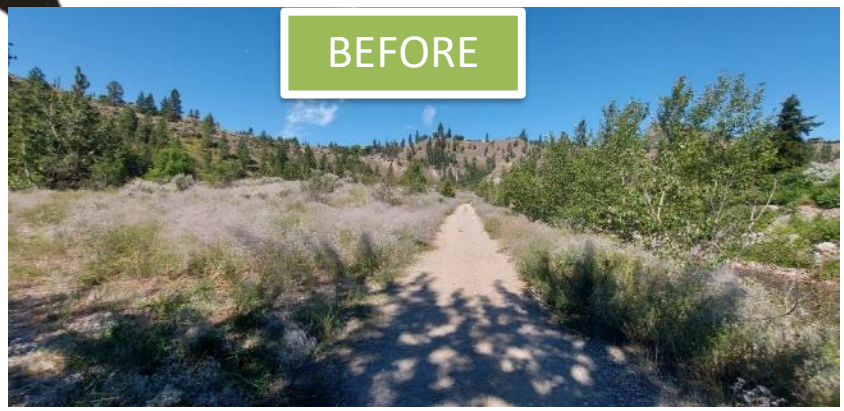
Newbury (2010)

ORRI SIDE CHANNEL RECONNECTION

Objective: create off-channel habitat for Chinook

Design: engage side-channel during high flows, but allow it to dry out before Okanagan River gets to hot for migration

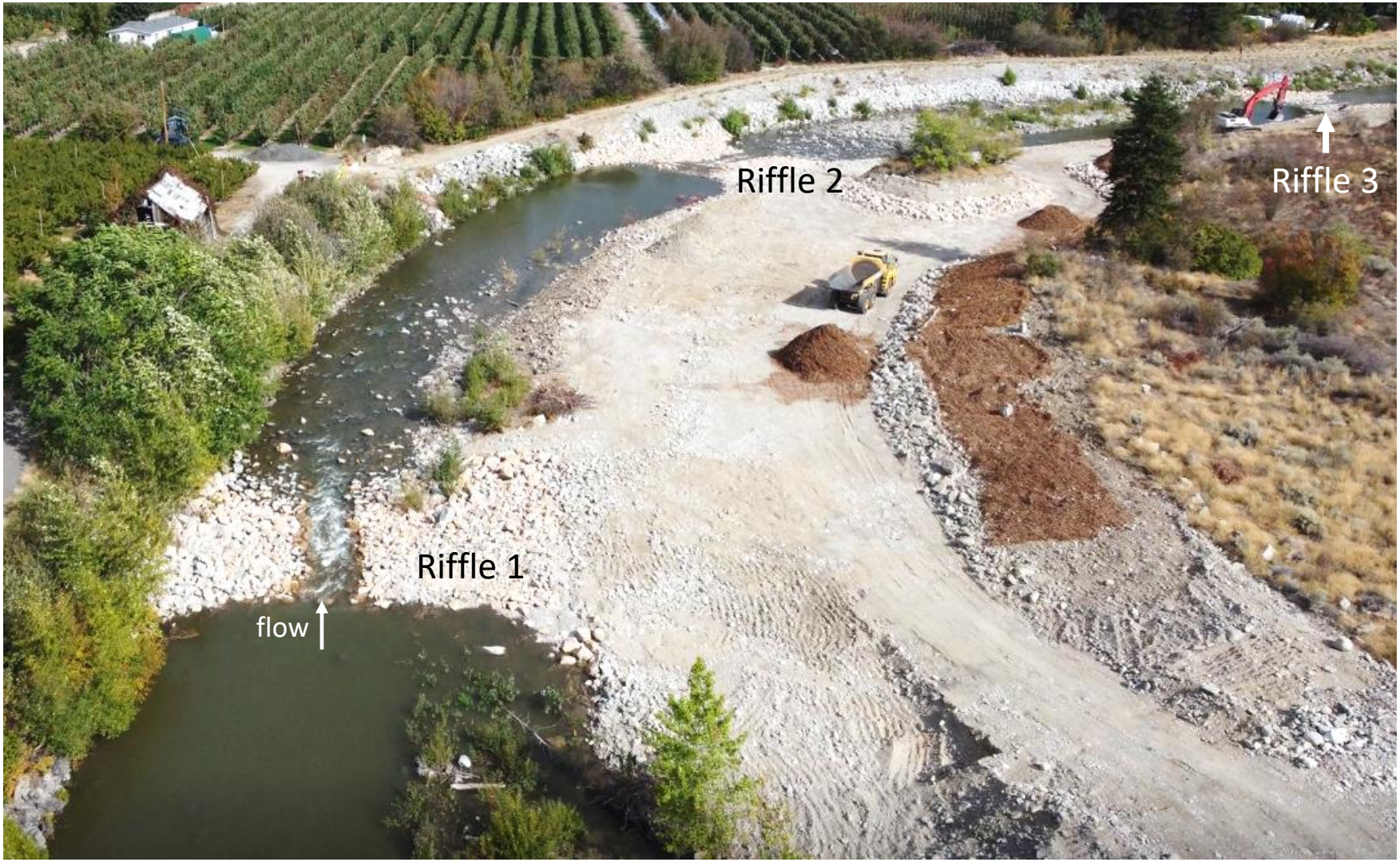
Trout Creek


BEFORE


AFTER
Re-purposed woody debris
Widened channel & back-watered pool from riffle. New salmon spawning gravel at riffle crest.
Installed riffle
New floodplain area
flow
floodplain outlet

Spring flow

Trout Creek



LIM LƏMT / THANK YOU

Floodplains are a vital part of the river

Typically inundated at floods $\geq Q_{2yr}$ (channel forming flows)

When designing floodplain reconnection projects, reflect on:

- Understand your channel-forming flows
- Understand your ecological and biological objectives
- Understand how the river has changed in response to modification (ex. hydraulics), and the constraints faced for restoration
- Dynamic rivers require dynamic approaches