My River, My Community

Dr Lincoln Fok

Department of Science & Environmental Studies

The Education University of Hong Kong

JC-WISE
Water Initiative on Sustainability and Engagement
賽馬會惜水・識河計劃

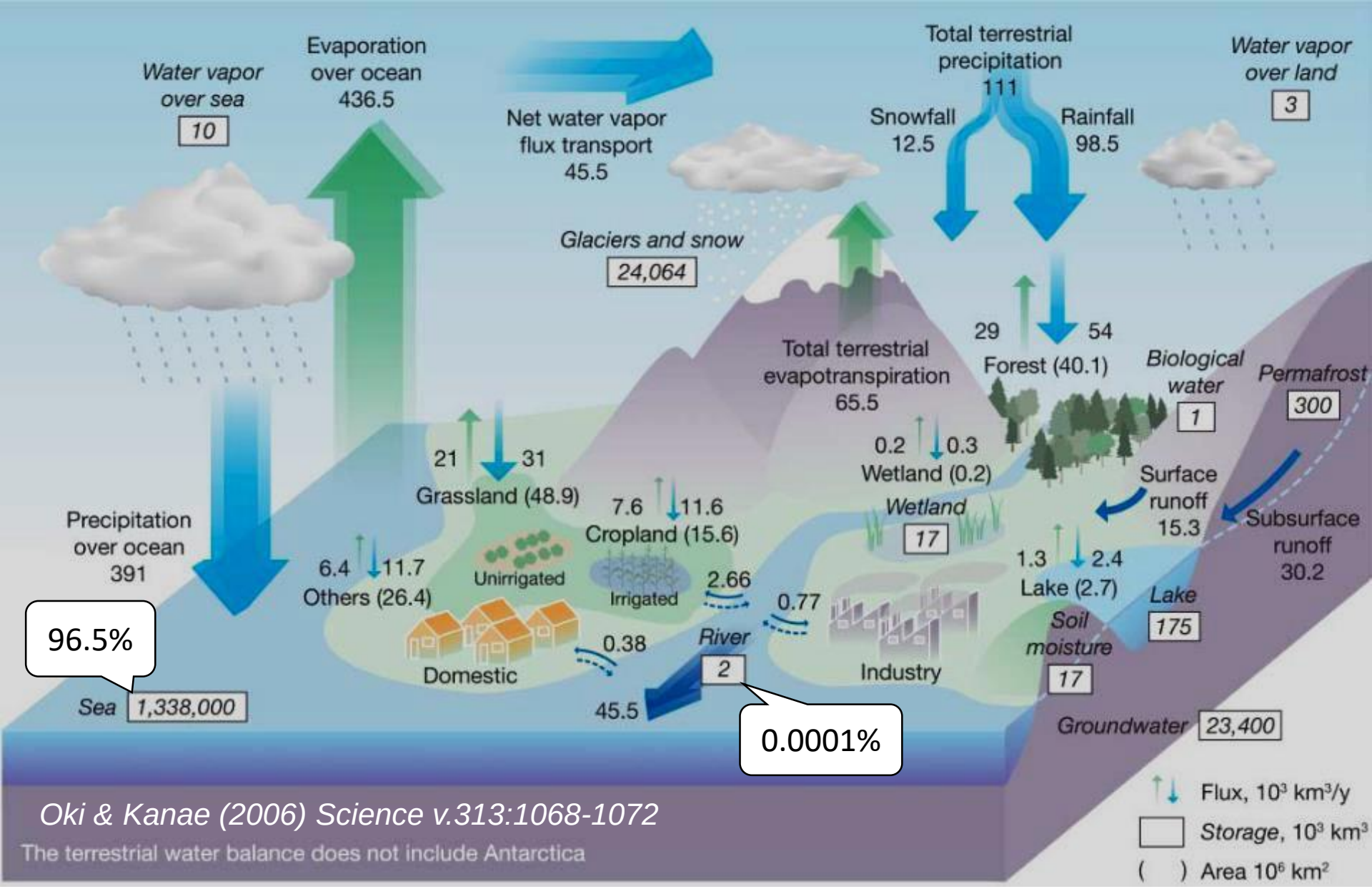


19.01.88 Oblique aerial photo © Lands Dept. HKSAR



Outline

1. Why do we want to know about rivers?
2. Rivers: from uplands to lowlands
3. Benefits & uses of rivers



Oki & Kanae (2006) Science v.313:1068-1072

The terrestrial water balance does not include Antarctica

Global Water Cycle

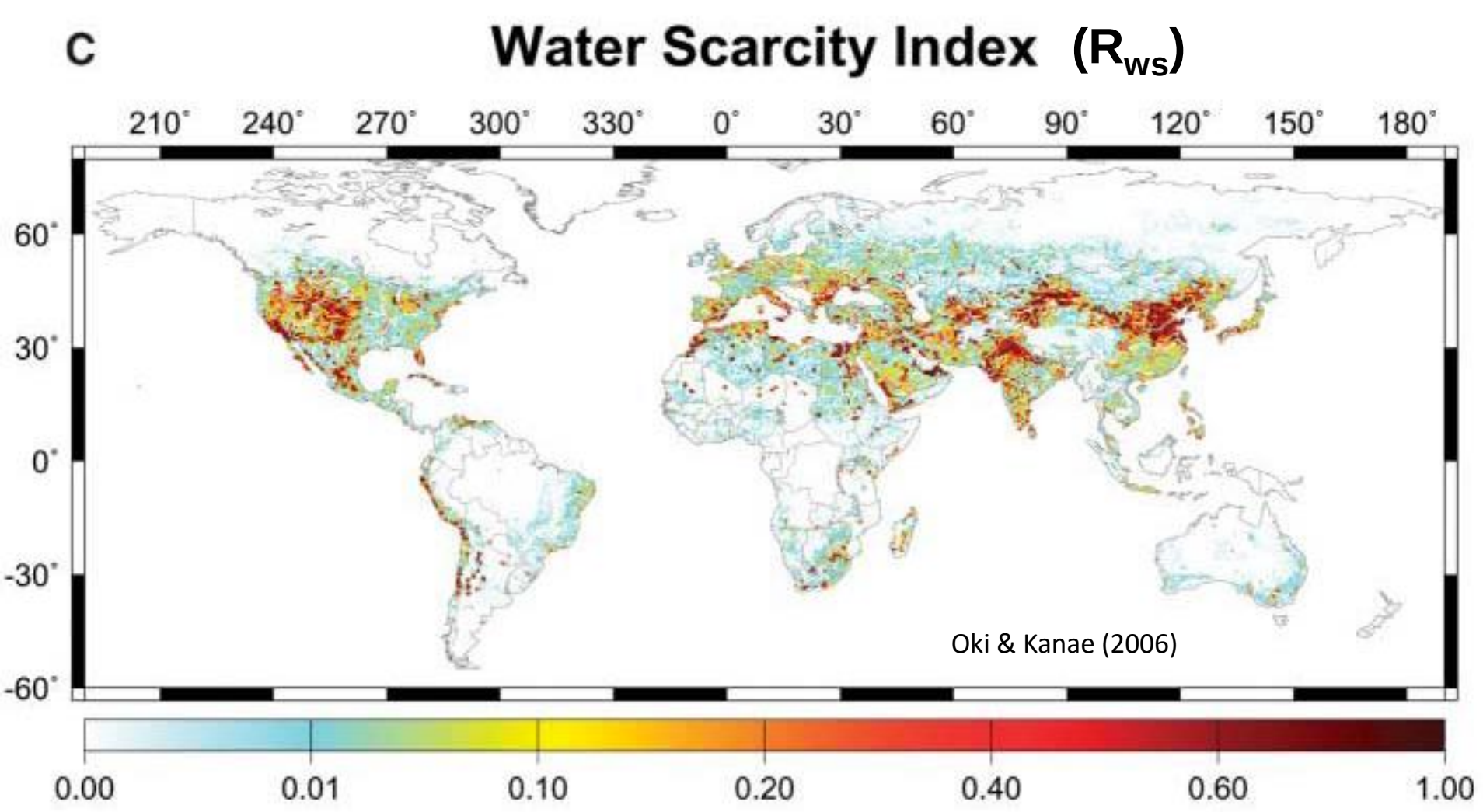
Storage	Volume [10^3 km^3]	Flux [10^3 km^3/yr]	Residence Time
Ocean	1,338,000	436.5	3000 years
Ground water	23,400	30.2	775 years
Lake	175	2.4	73 years
River	2	45.5	**16 days**
Atmosphere	13	502	**9.5 days**

$$= \frac{Volume}{Flux}$$

Average Residence Time of Water

(滞留時間)

Short RT = **renewable**

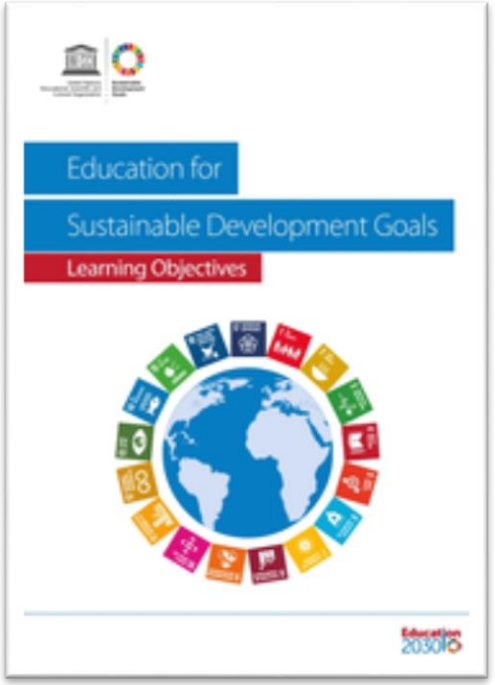


$$R_{ws} = \frac{Water\ withdrawal\ - desalinated\ water}{Renewable\ freshwater\ resources}$$

- **2.4 billion** people (≈**31%**) highly water-stressed areas (R_{ws} > 0.4)

Education for Sustainable Development Goals (ESD)





Recommendations for implementation:

- Integrating ESD in policies, strategies & programmes
- Integrating ESD in curricula & textbooks
- Integrating ESD in **teacher education**
- Promoting a whole-institution approach
- Applying **action-oriented transformative pedagogy**




CW88545 10 Nov 2010 12000' MA LIU SHUI
香港特別行政區政府 地政總署測繪處
Survey & Mapping Office, Lands Department
The Government of Hong Kong Special Administrative Regi
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Rivers: from uplands to lowlands
10.11.10 Oblique aerial photo © Lands Dept. HKSAR

CW88545 10 Nov 2010 12000' MA LIU SHUI

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香港特別行政區政府 地政總署測繪處

Colluvial 崩積
- Hillslope coupling
- Mass movement
- Debris flow initiation & scour

Bedrock 基岩
- Debris flow
- Flash flood
- Sediment transport

Alluvial 沖積
- Sediment storage
- Channel migration
- River avulsion
- Flooding

Estuarine 河口
- Tide
- Wave
- Alternating flow direction

Generalised **Valley Segments** along the longitudinal profile of a river

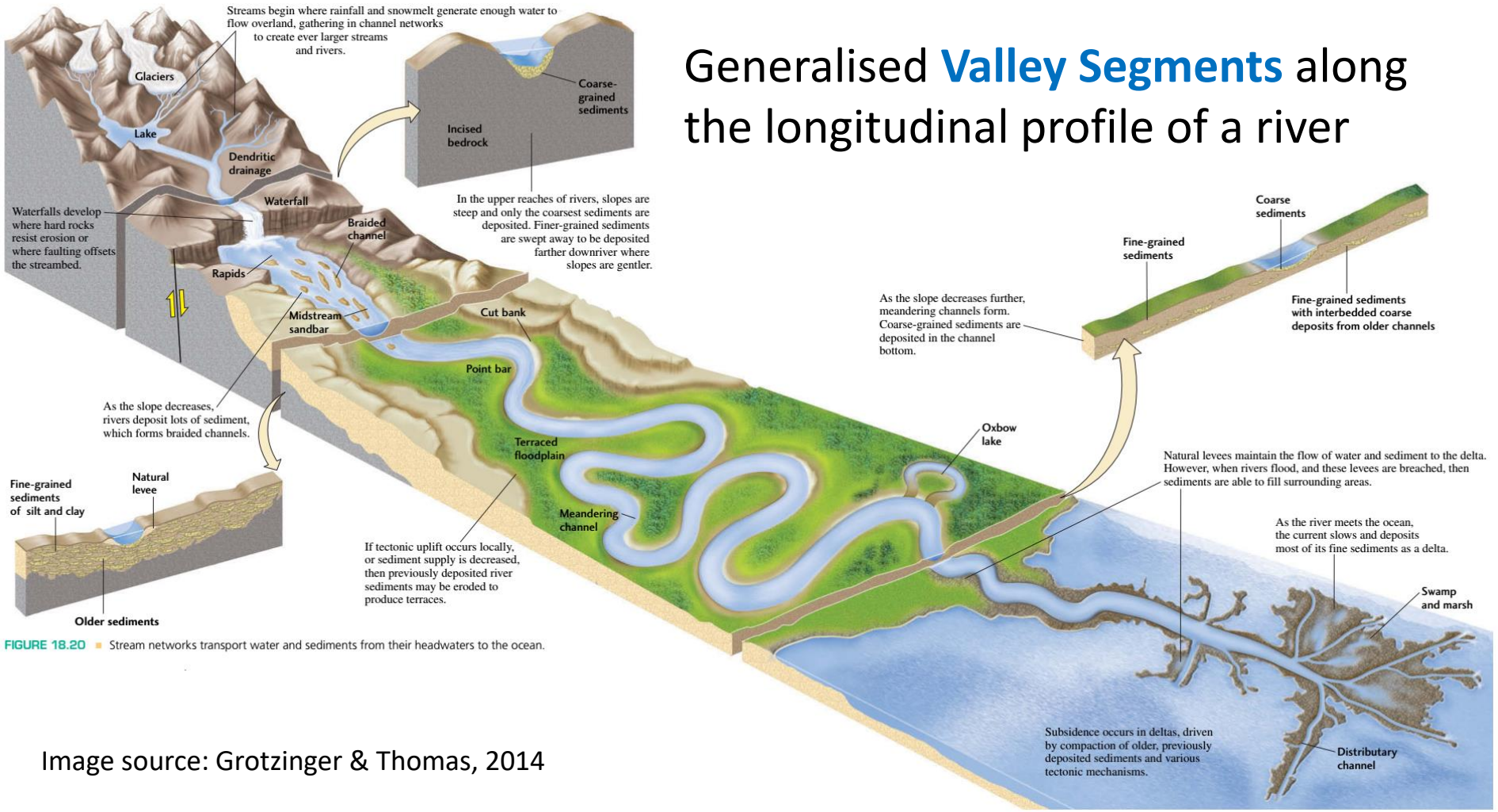


FIGURE 18.20 ■ Stream networks transport water and sediments from their headwaters to the ocean.

Image source: Grotzinger & Thomas, 2014

Valley Segments

- **Colluvial 崩積**
  - Confined valley
  - Headwater catchment; A = 1 – 10 km^2
  - Valley fills, limited fluvial processes
    - Sometimes ephemeral
  - Transport by mass wasting/ rare high flow events
  - Sed supply >> erosion
- **Bedrock 基岩**
  - Confined valley
  - Lacks valley fill / patchy alluvium
    - Sed supply limited
  - Straight channels
  - Knickpoint; rate of incision set pace of landscape evolution
- **Alluvial 沖積**
  - Partly confined / laterally-unconfined
  - Thick deposits, sorted → forming floodplain
  - Lacks sed supply from mass wasting
  - Lateral migration of sed
  - Varying channel patterns
- **Estuarine 河口**
  - Laterally unconfined
  - Transition from terrestrial to marine environments
  - Low gradients, tidal influence, fine sed

Relationship between downstream changes of variables along a typical concave-up longitudinal profile

(Fryirs & Brierley, 2012)

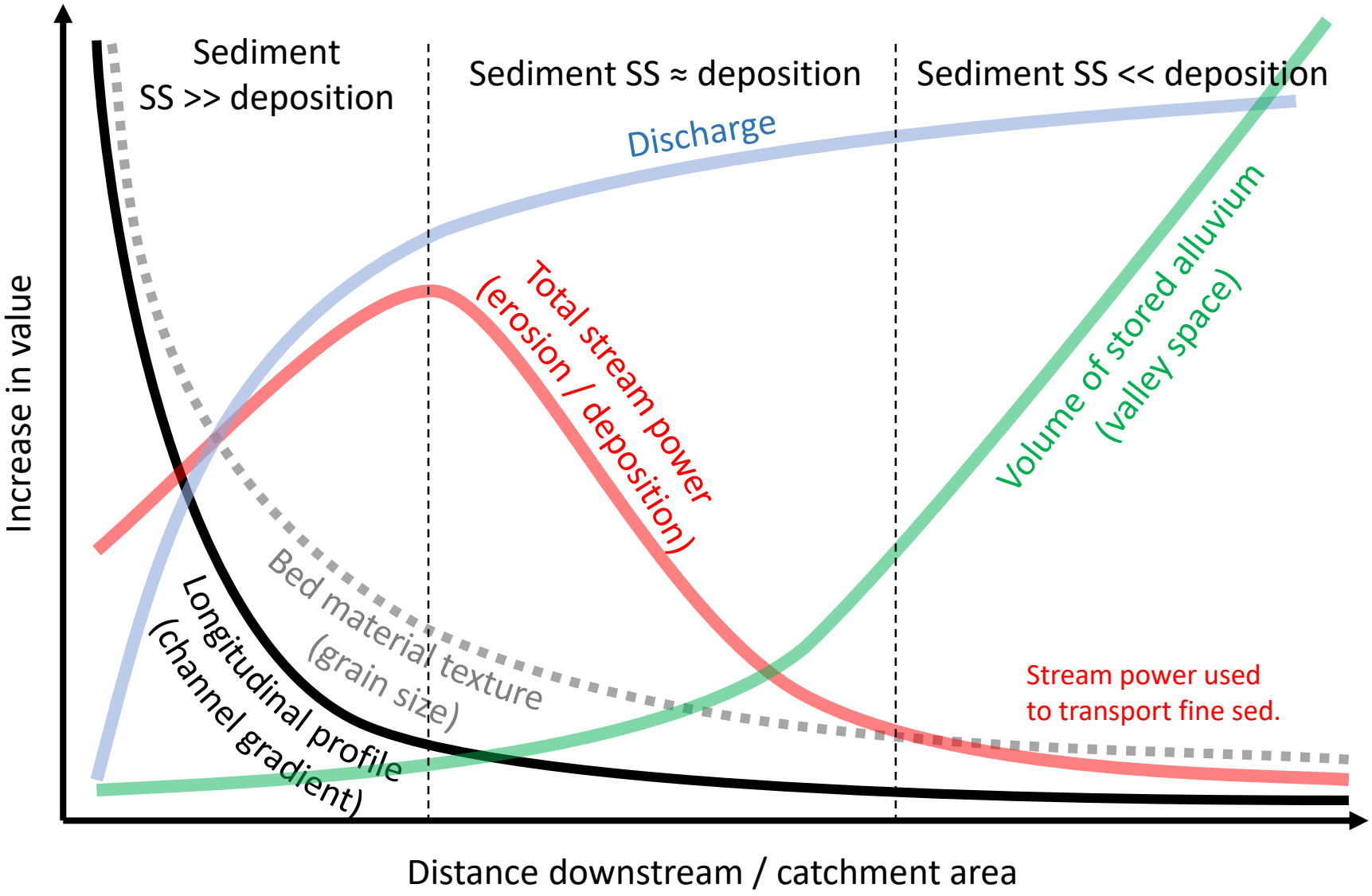


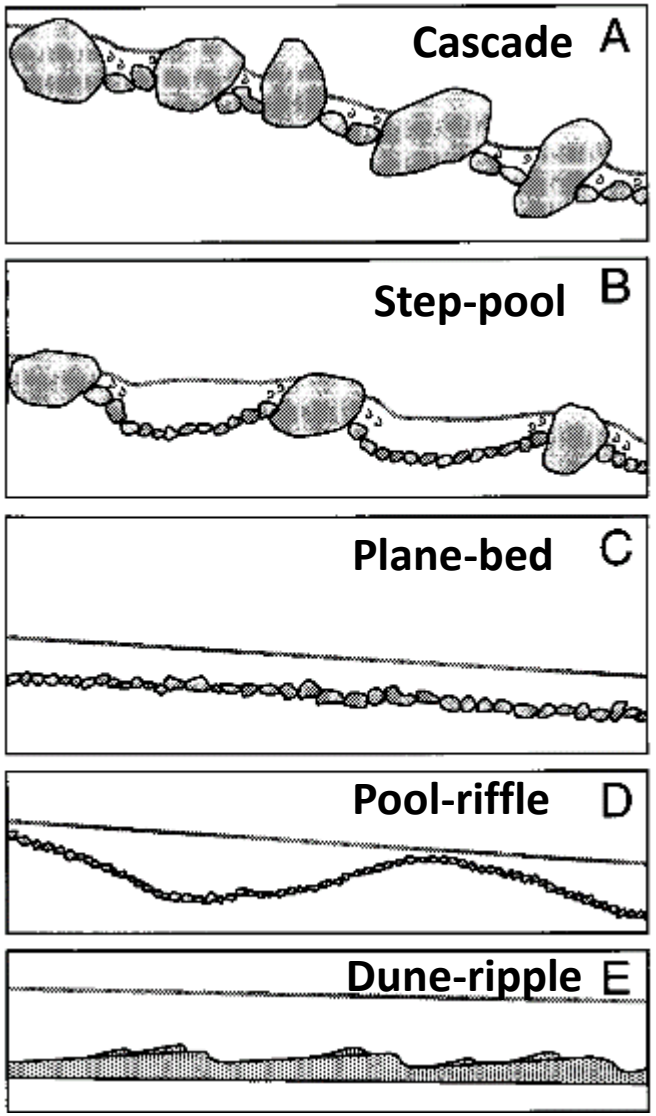


Image source: Geotechnical Engineering Office, HKSAR


2.02.63 Vertical aerial photo © Lands Dept. HKSAR
往
鉛礦坳
Ephemeral
stream
Landslide
scar
草坑石澗
大坑石澗
灰橋
水塘
Abandoned
terraces







Montgomery & Buffington (1997)

31.12.64 Vertical aerial photo © Lands Dept. HKSAR

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26.01.63 Vertical aerial photo © Lands Dept. HKSAR
Flow dir.
Pool-riffle reach
大圍村
車公廟
Mangrove


香港特別行政區政府 地政總署測繪處
Survey & Mapping Office, Lands Department
The Government of Hong Kong Special Administrative Region
P4F200
1033
大圍村
車公廟
8.02.15 Oblique aerial photo © Lands Dept. HKSAR
CW113314 08 Feb 2015 2000' TAI WAI
OBLIQUE
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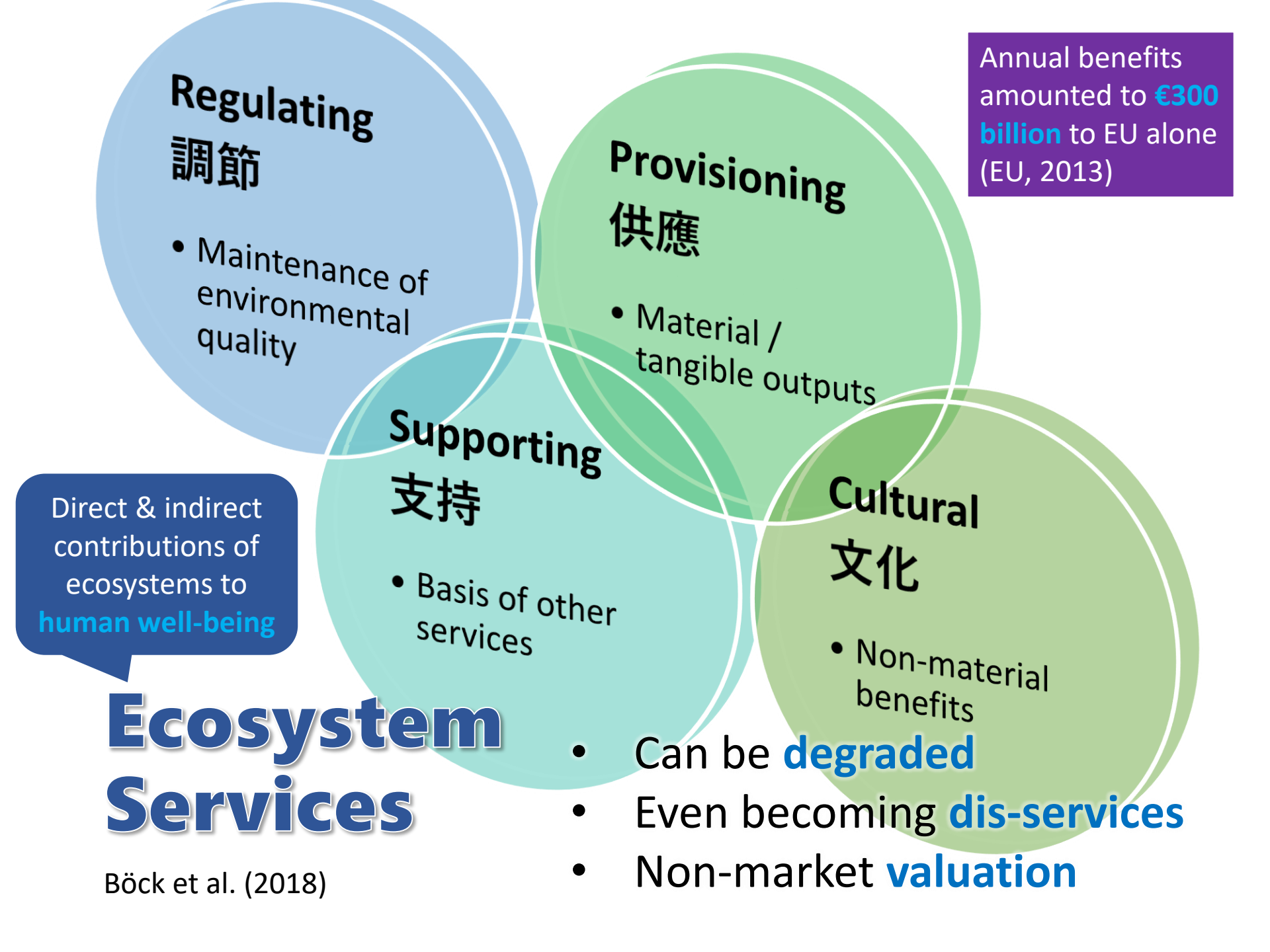
Benefits & Uses of Rivers



Sweeping curves of a meandering stream on the Yuen Long plain (cedd.gov.hk)


危　險
DANGER
排洪河道，切勿進入
FLASH FLOODS, STAY AWAY
渠務處
DRAINAGE SERVICES DEPARTMENT
☎ 2300 1110


Benefits to human:
• Buffering flood flows (regulating)
• Maintenance of floodplain fertility (supporting)
• Agriculture (provisioning)


Regulating
調節
• Maintenance of environmental quality
Provisioning
供應
• Material / tangible outputs
Supporting
支持
• Basis of other services
Cultural
文化
• Non-material benefits
Annual benefits amounted to €300 billion to EU alone (EU, 2013)
Direct & indirect contributions of ecosystems to human well-being
Ecosystem Services
• Can be degraded
• Even becoming dis-services
• Non-market valuation
Böck et al. (2018)

Floodplain Encroachment

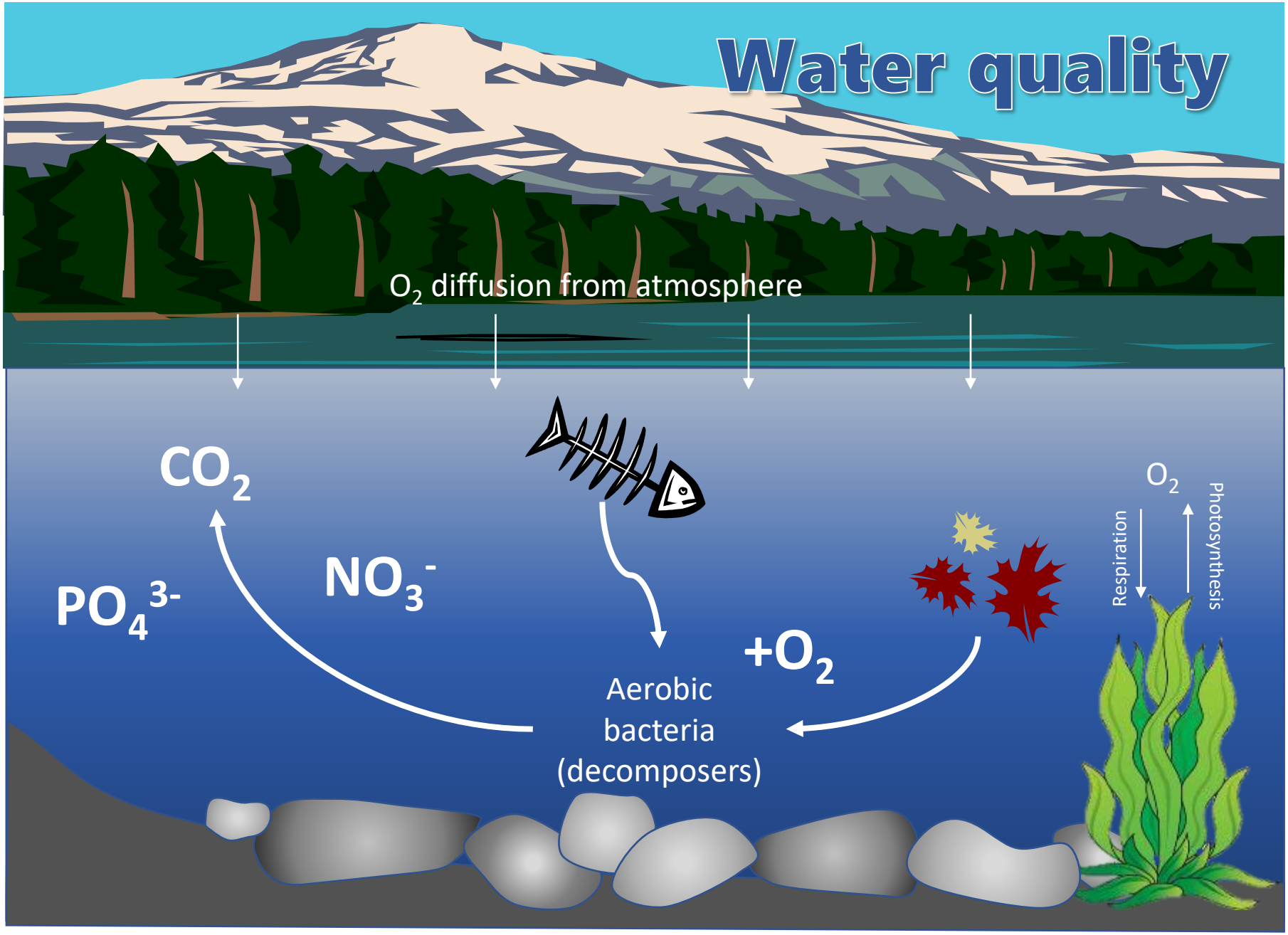



La Jonction in Geneva
R. Rhône
R. Arve
Image source:
Wikipedia

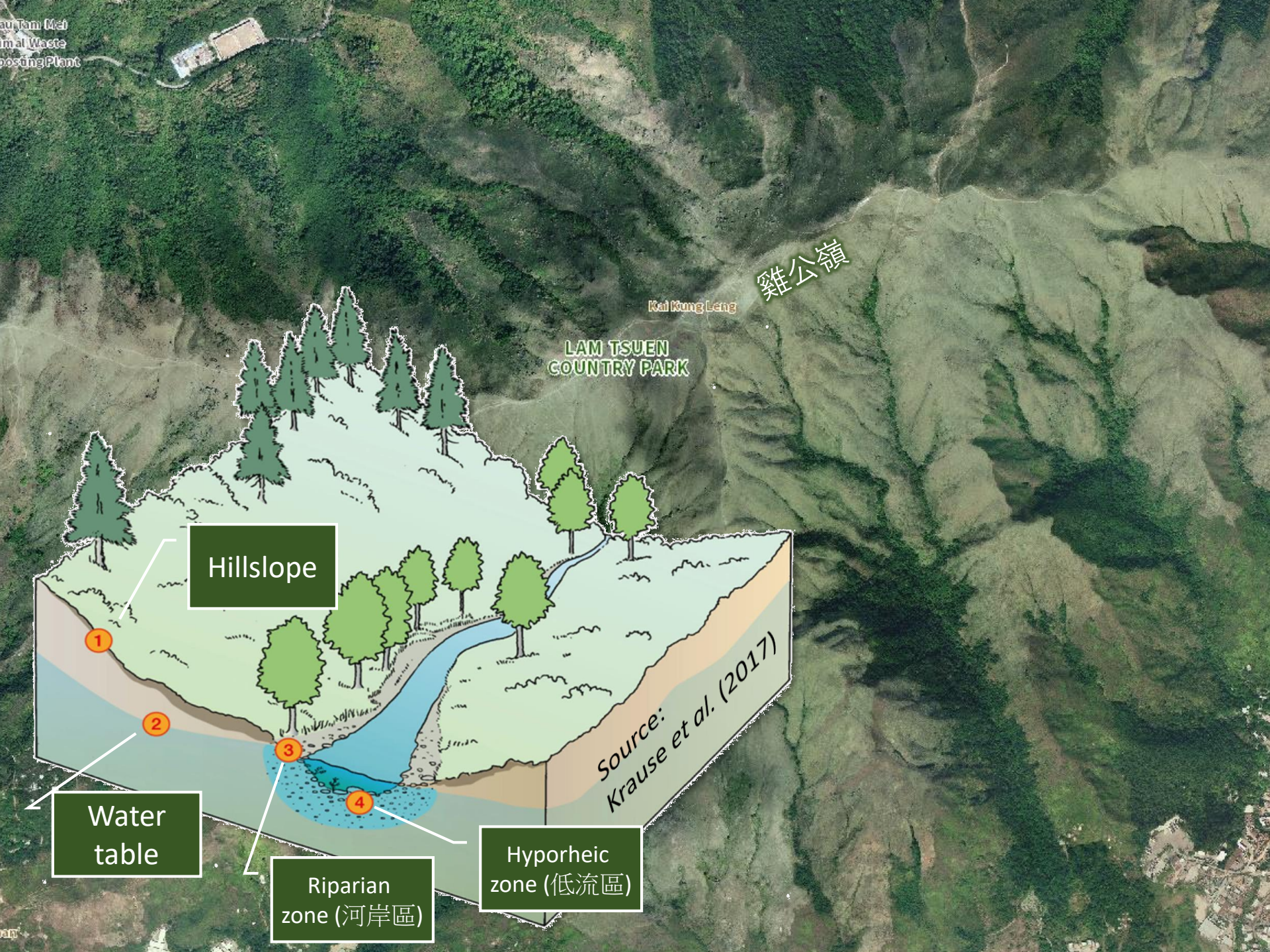
Dam removal at
Elwha River, WA; 2001



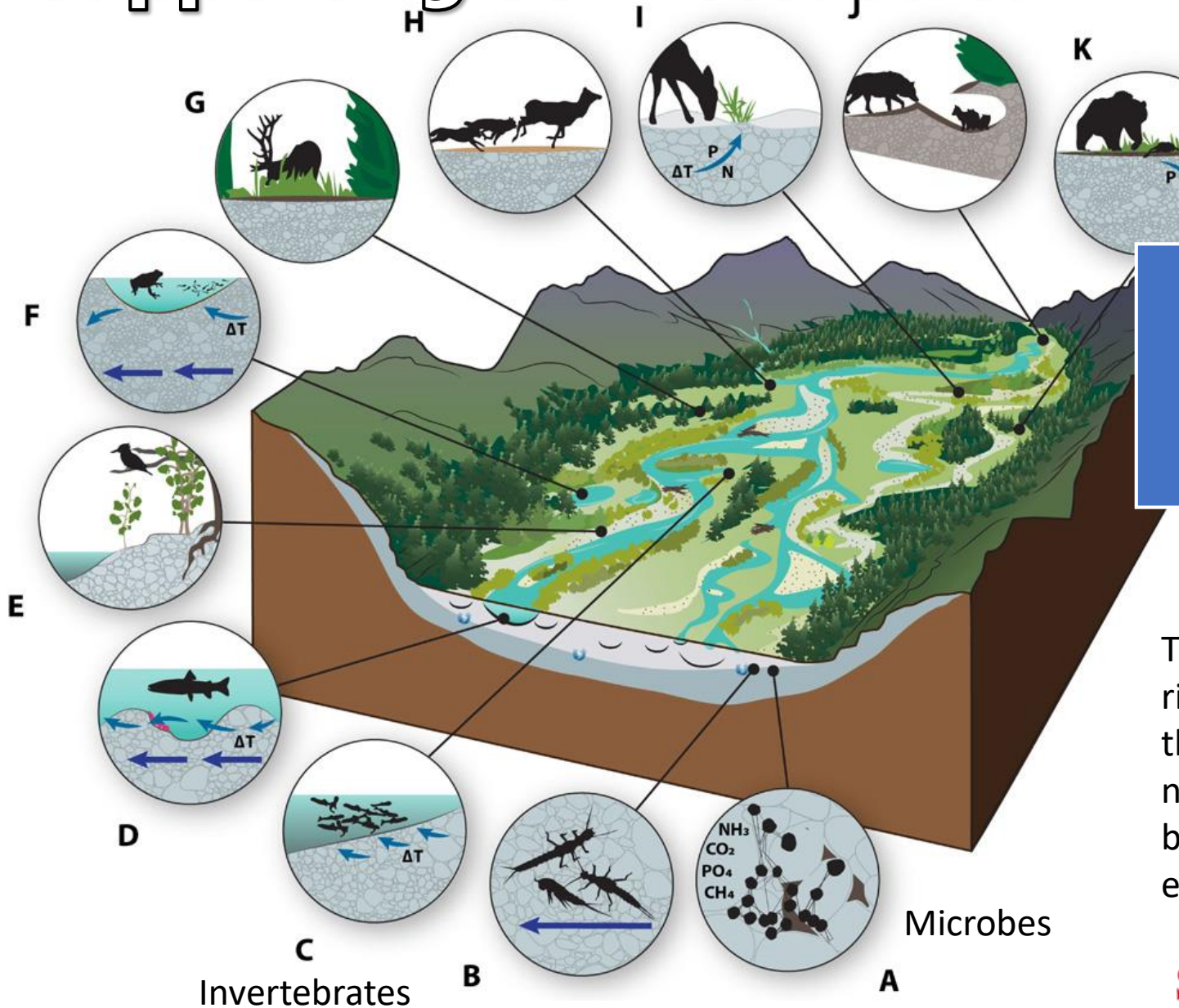

New delta formed at
Strait of Juan de Fuca


Water quality
O_2 diffusion from atmosphere
CO_2
NO_3^-
PO_4^{3-}
$+O_2$
Aerobic bacteria (decomposers)
O_2
Respiration
Photosynthesis




Hillslope
Water table
Riparian zone (河岸區)
Hyporheic zone (低流區)
1
2
3
4
Source: Krause et al. (2017)
LAM TSUEN COUNTRY PARK
Kai Kung Leng
雞公嶺

Supporting Services: stream habitats



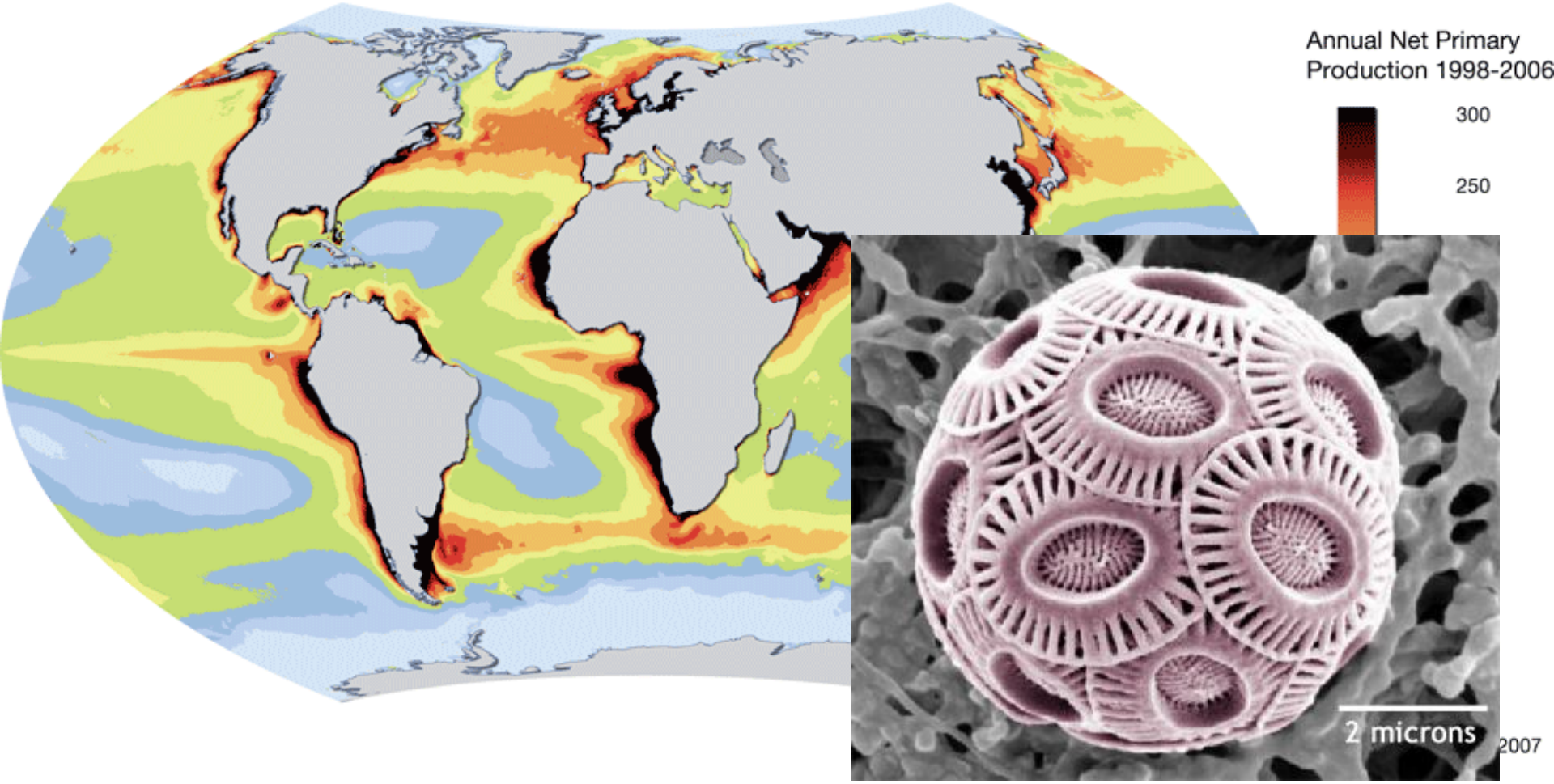
Varying flow velocity, water depth & temperature

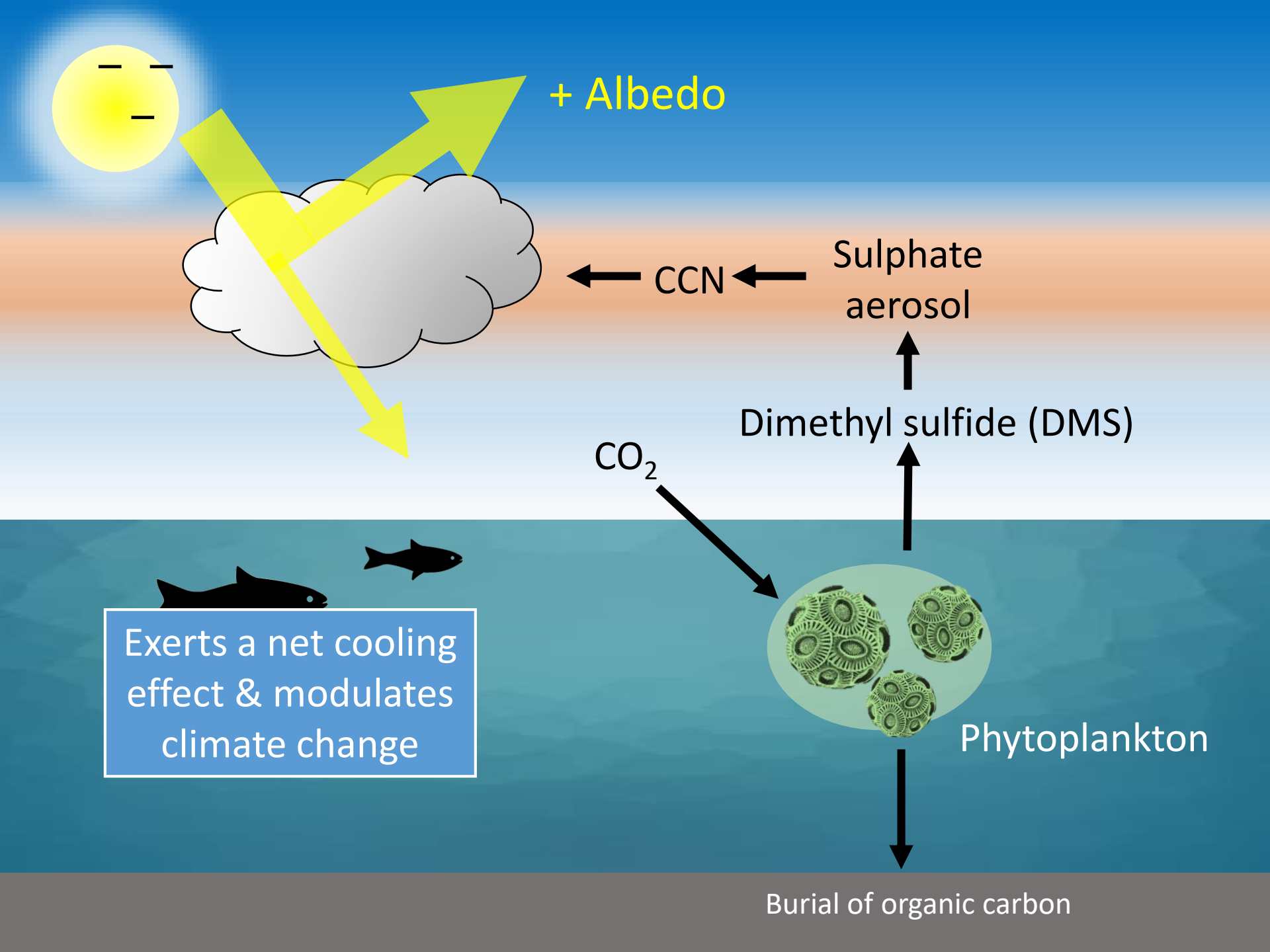
The gravel-bed river floodplain as the ecological nexus of regional biodiversity (Hauer et al. 2016)

ScienceAdvances
AAAS


Yellow Sea
R. Yangtze
Sediment plume
沉積物羽流
East China Sea
Source: NASA
MODIS Web

Net Primary Production
淨初級生產量




+ Albedo
CCN
Sulphate aerosol
Dimethyl sulfide (DMS)
CO_2
Exerts a net cooling effect & modulates climate change
Phytoplankton
Burial of organic carbon

Provisioning Services







Concentration of pollutants:
mg/L, ppm

Average wholesale price of sand



Source: www.censtatd.gov.hk





Cultural Services



Skógafoss waterfall, Iceland
(Wikimedia Commons)



"What happens to a species that loses touch with its habitat?"
-Pyle (2007)



- From nature lovers to general public
- Infrastructure
- Promotion of water-friendly culture
  - Awareness, attitude, action

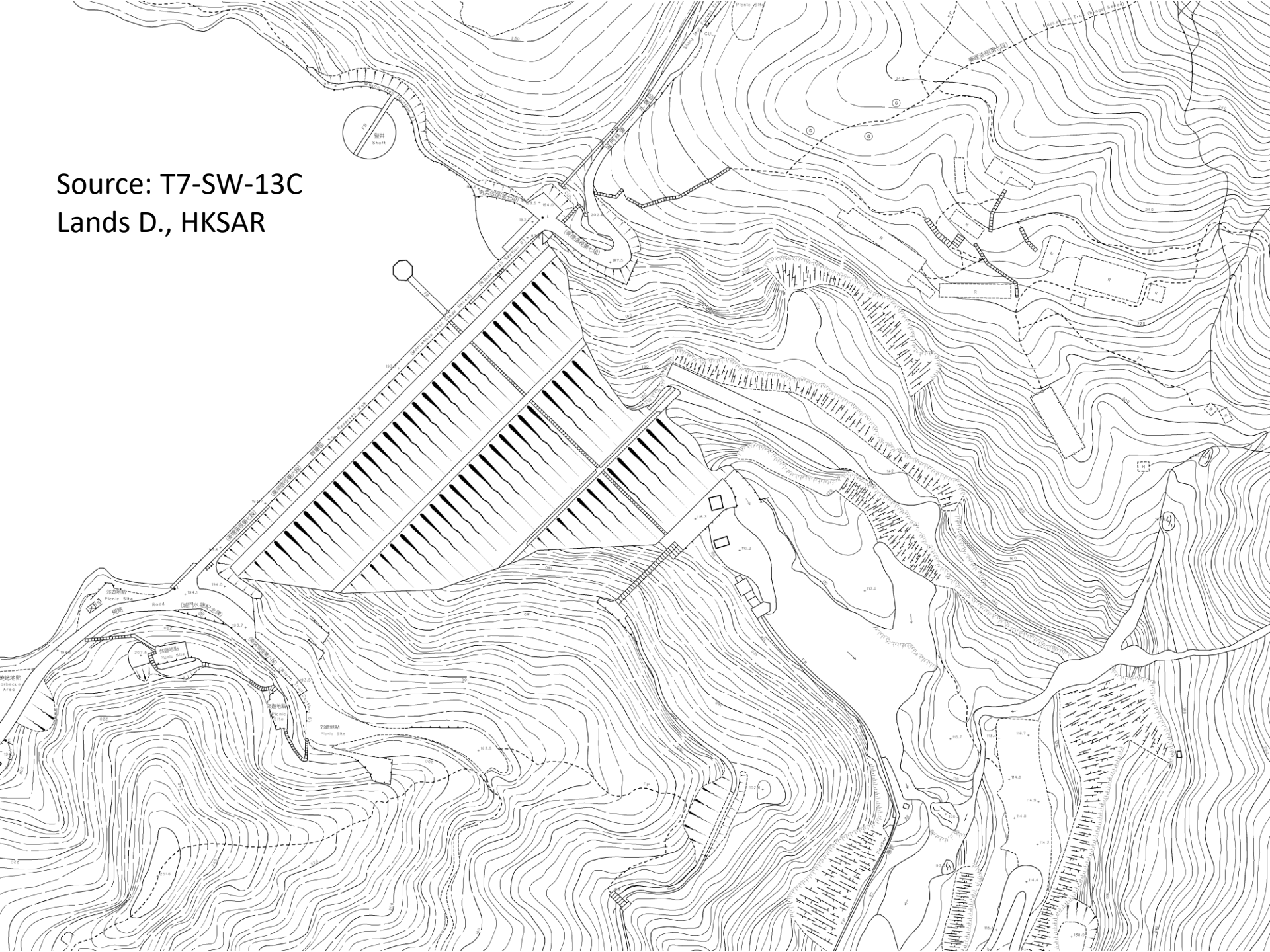
Source: www.kaitakriverwts.hk

Take Home Messages

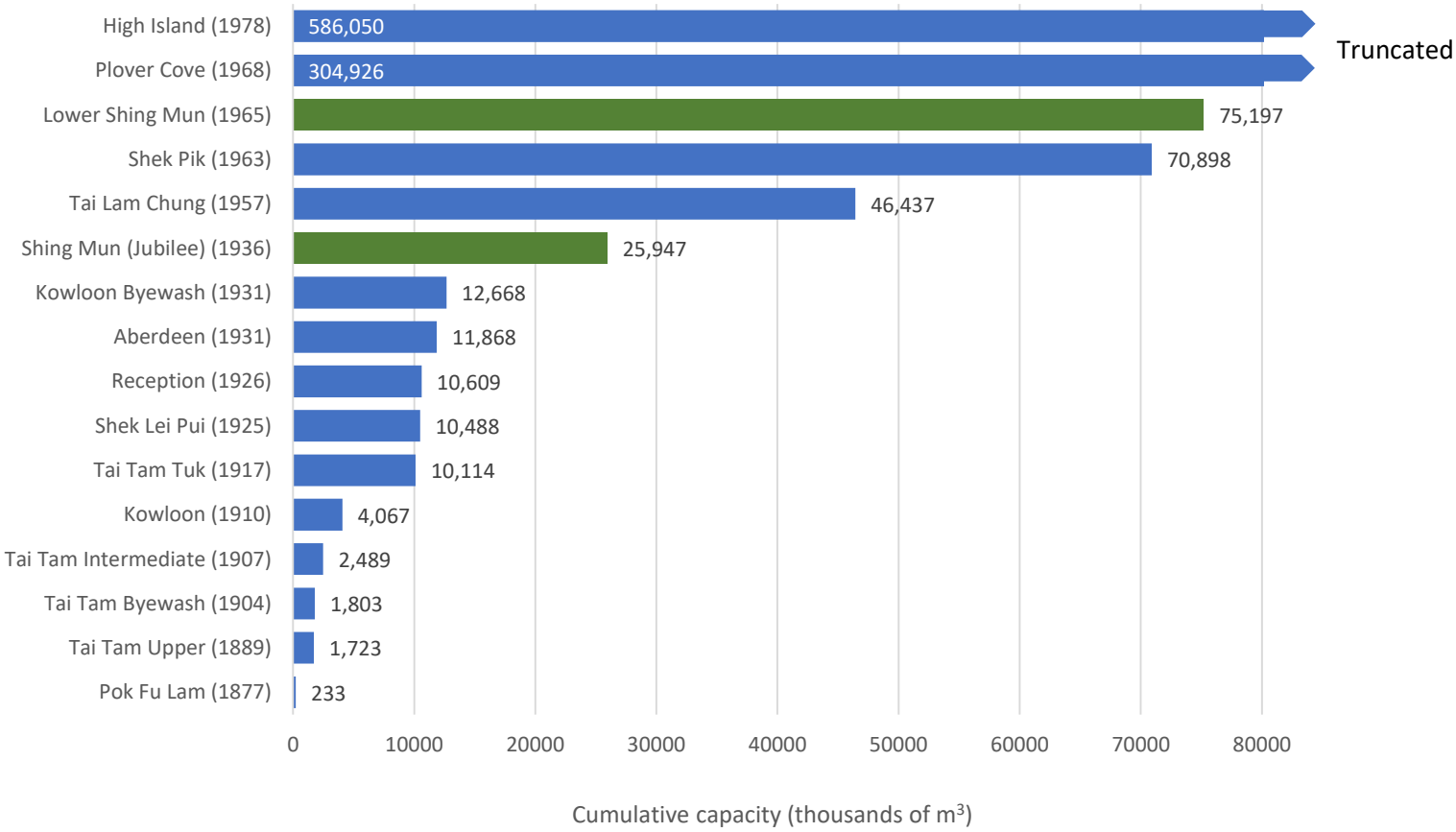
- River as a main source of renewable freshwater resources
- A third of world's population is living in highly water-stressed area
- River does not only carry water
- River maintain a dynamic equilibrium among channel gradient, discharge, sediment load & caliber. Interactions of these factors result in geomorphologic (∴ habitat) variation along the longitudinal profile
- River & associated processes bring tangible & intangible benefits to human
- People's connectedness to nature is vital to achieving sustainable development goals


Source: T7
Lands D., HKSAR Govt.




Source: T7-SW-13C
Lands D., HKSAR

At year of completion, Total reservoir (cumulative) capacity



Jubilee Dam 1932 – 6

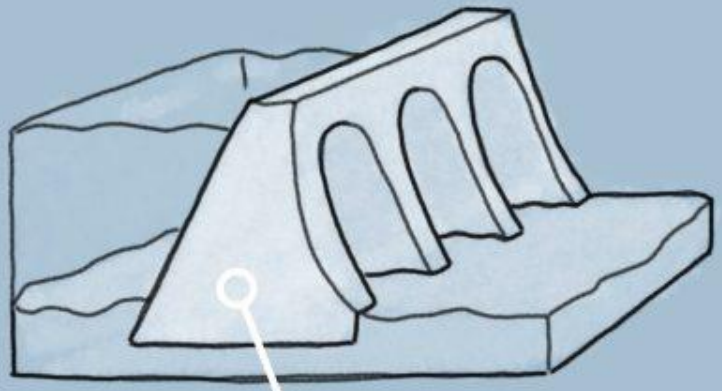
- H = 88 m
- moved 8 villages, 855 persons
- **Nisi Domunus Frustra**
  - 《詩篇》Psalm 127
  - “Except the Lord in vain”
  - 「謀事在人，成事在天(主)」
- Workforce 2500
  - Malaria infection 12% workforce
  - Industrial accident: 26 casualty



英國愛丁堡市議會徽章 (Coat of Arms)
Source: https://www.heraldry-wiki.com/

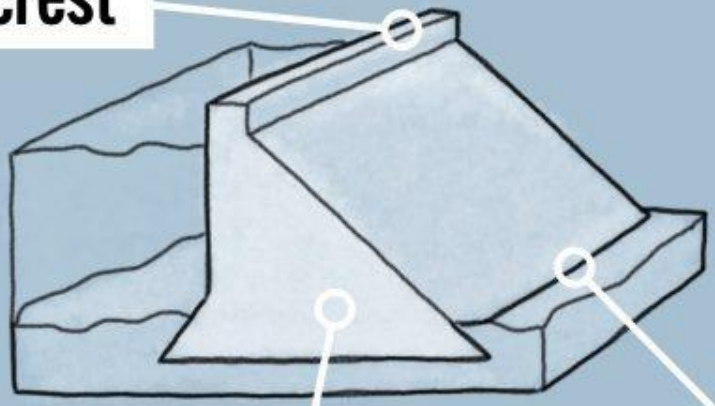


embankment dam



buttress dam

crest



gravity dam

heel

arch dam

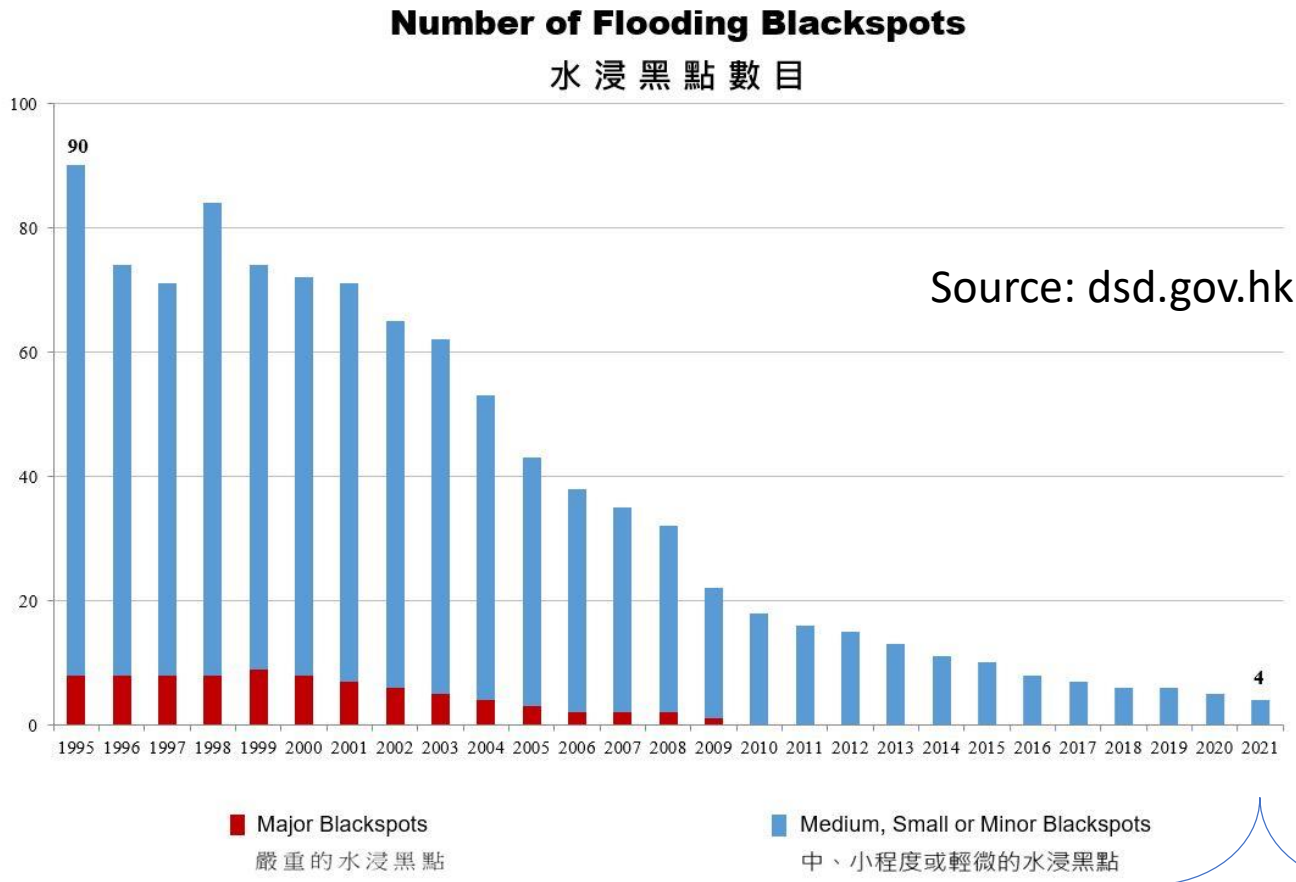


dam types

www.inchbyinch.de


Lower Shing Mun Dam & Tai Wai Nullah
Embankment
Spillway
inlet
Source: Vince C @YouTube

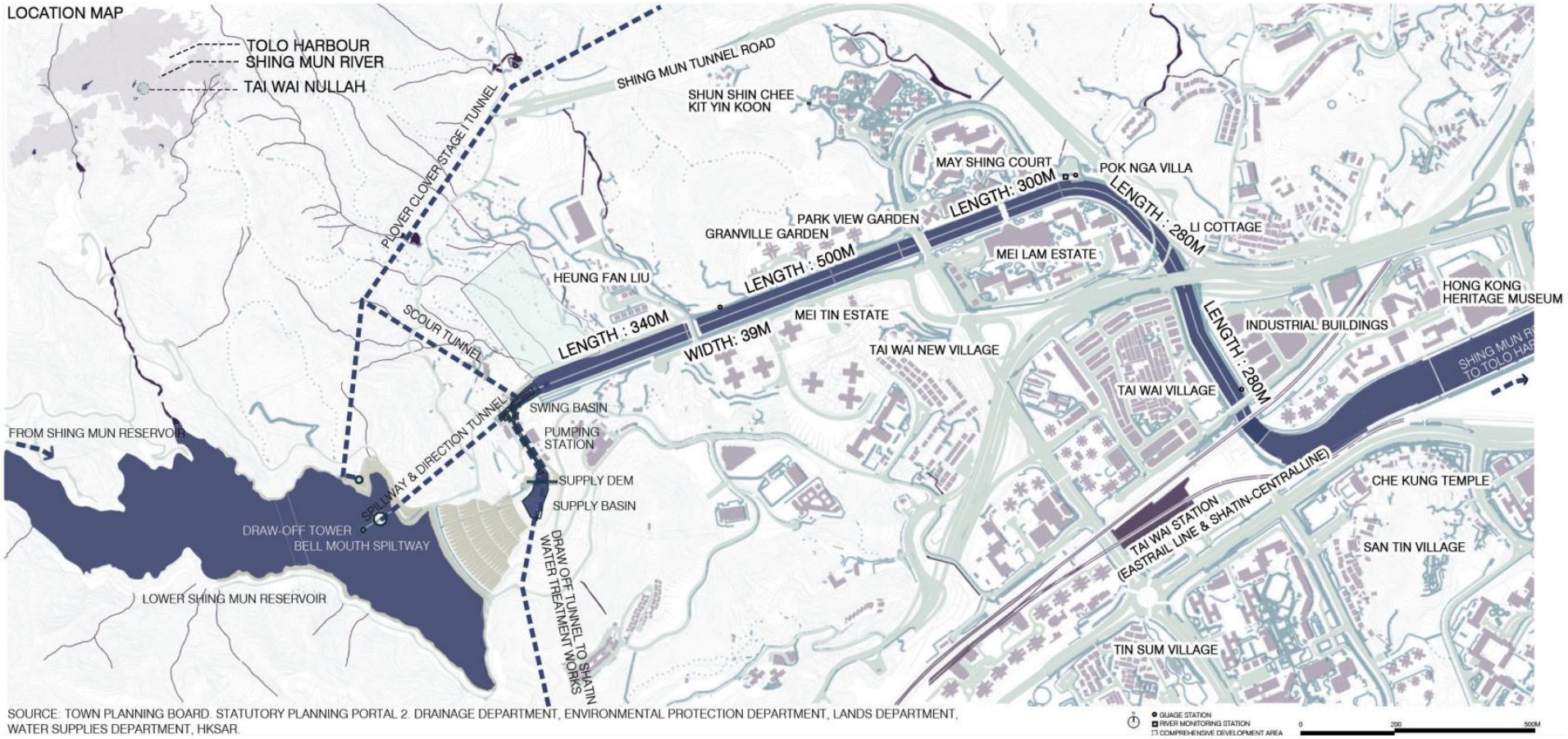

Source: Chung Ho
Google
Image capture: Feb 2019 Images may be subject to copyright



Source: dsd.gov.hk

1. 元朗　　新田石湖圍
2. 大埔　　林村谷盆地
3. 油尖旺　　漆咸道南
4. 南區　　薄扶林村

Tai Wai Nullah



Source: Wong, YK (2015)

Revitalisation of Tai Wai Nullah



Source: www.devb.gov.hk



Shing Mun River bank after passage of Super Typhoon Hato (1713)

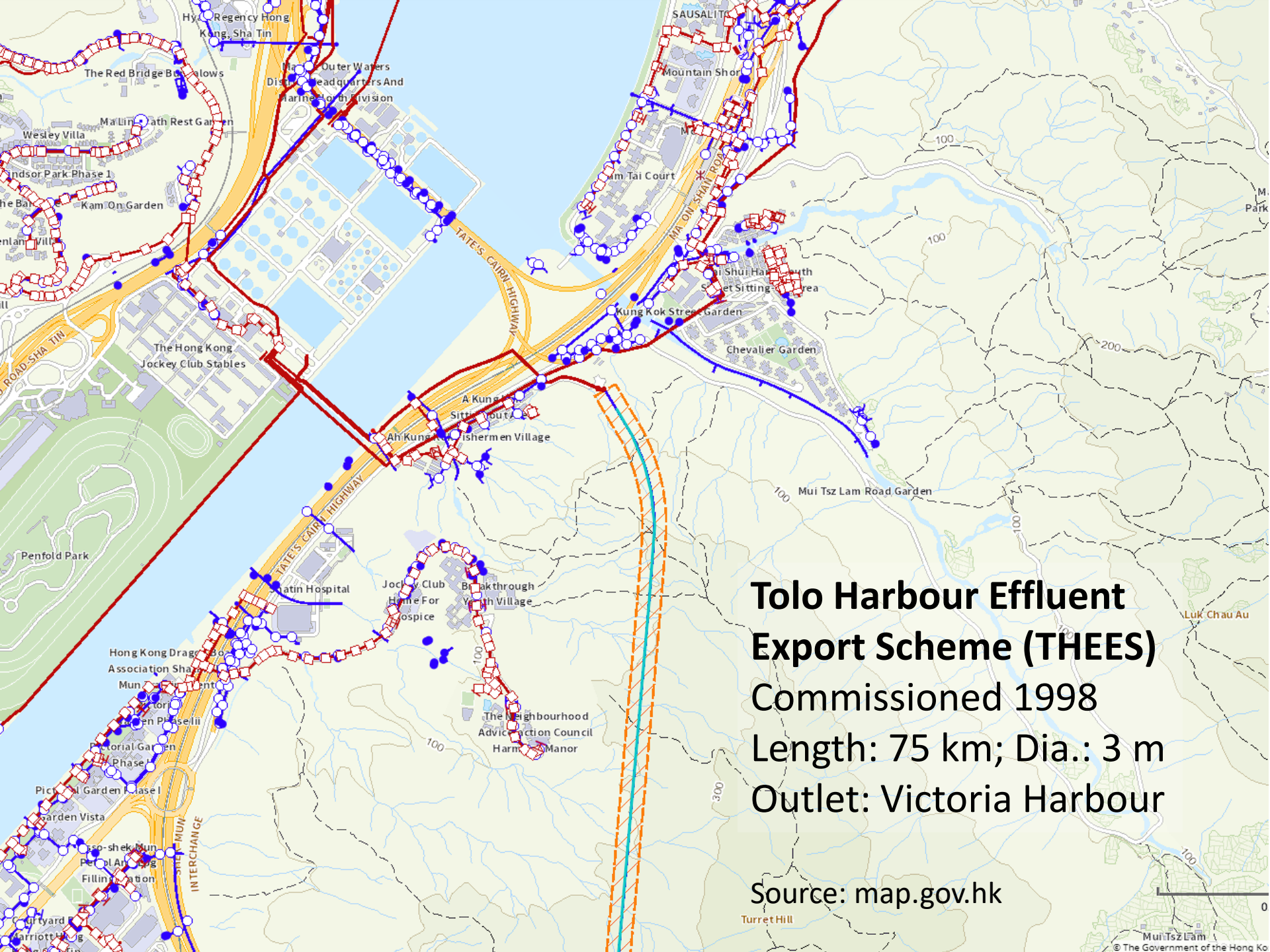
Source: www.hko.gov.hk

Estuary & River

Waterbody 水體		Salinity [‰; per mil]
Fresh	淡水	<0.5
Brackish	微鹹水	0.5 – 30
Saline	鹹(鹽)水	30 – 50
Brine	滷水	>50



Source: DSD


Tolo Harbour Effluent Export Scheme (THEES)
Commissioned 1998
Length: 75 km; Dia.: 3 m
Outlet: Victoria Harbour
Source: map.gov.hk
TATE'S CAIRN HIGHWAY
MA ON SHAN ROAD
Penfold Park
Mui Tsz Lam Road Garden
Chevalier Garden
Kung Kok Street Garden
Luk Chau Au
Turret Hill

香港河溪生態

Ecology in Hong Kong's Rivers

呂德恒
Henry Lui

綠色力量
GREEN POWER









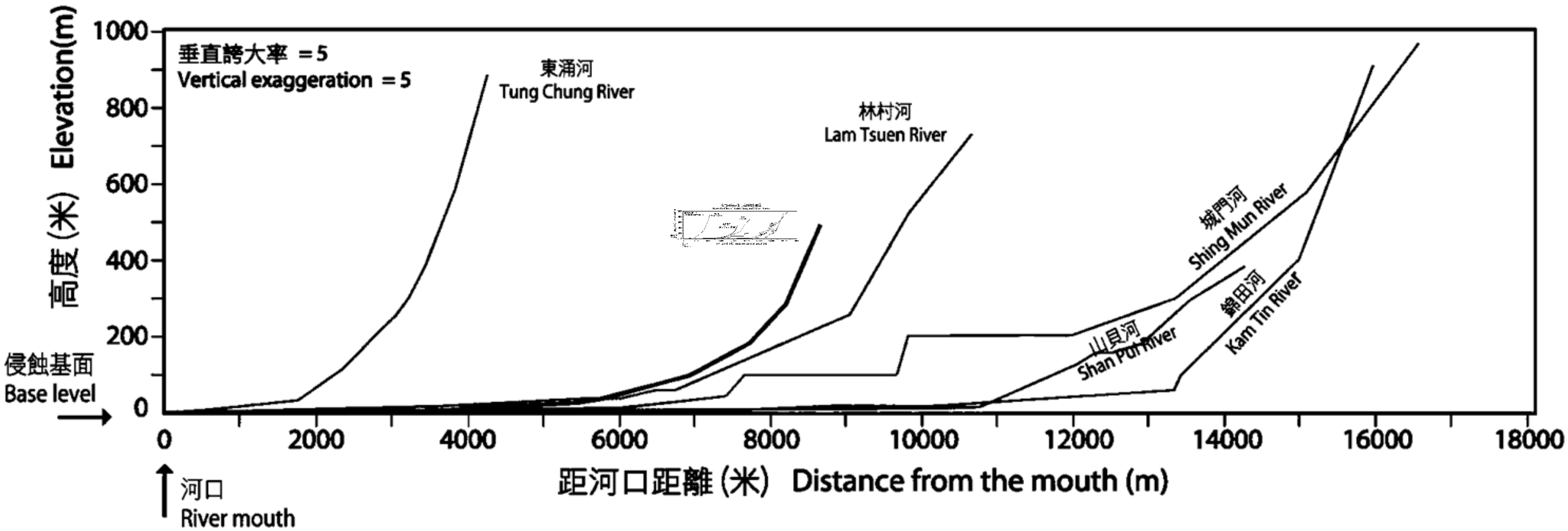








河流縱剖面圖
River Profiles



上游
Upper Course



下游
Lower Course



河口
Estuary



何謂生態學？
What is Ecology?

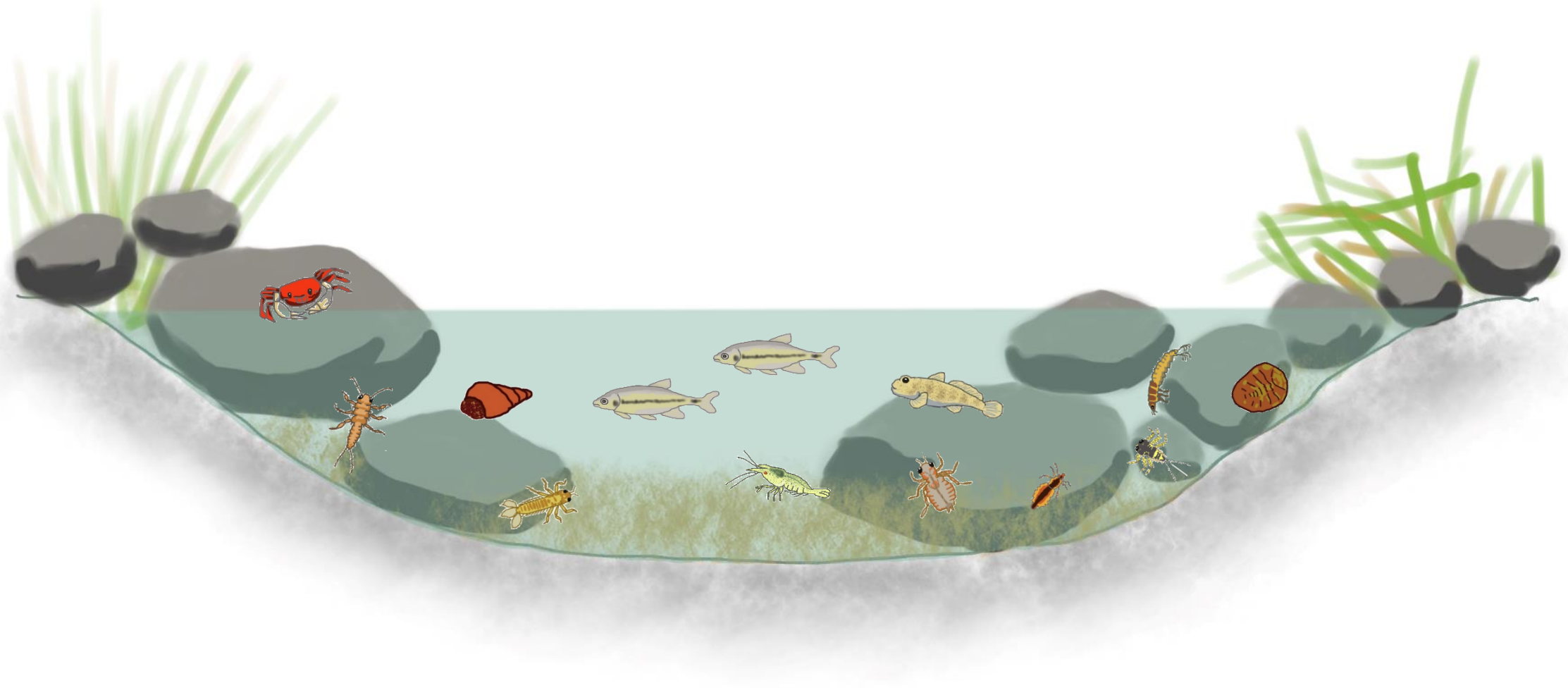
- 研究生物與其環境之間的相互作用
  The study of the interactions between organisms and their environment.

- 研究該些決定生物分佈和數量的相互作用
  The study of the interactions that determine the distribution and abundance of organisms.




水潭
Pool
淺流區
Riffle

微生境 Micro-habitat



功能性攝食組別 Functional Feeding Groups

(ngit^{6})

- 嚙食者 / 刮食者 grazer / scrapers
- 撕食者 shredders
- 收集者 collectors
  - 收集者—採集者 collector-gatherers
  - 濾食者 filter-feeders
- 捕食者 predators

- 嚙食者—刮食者 grazer-scrapers



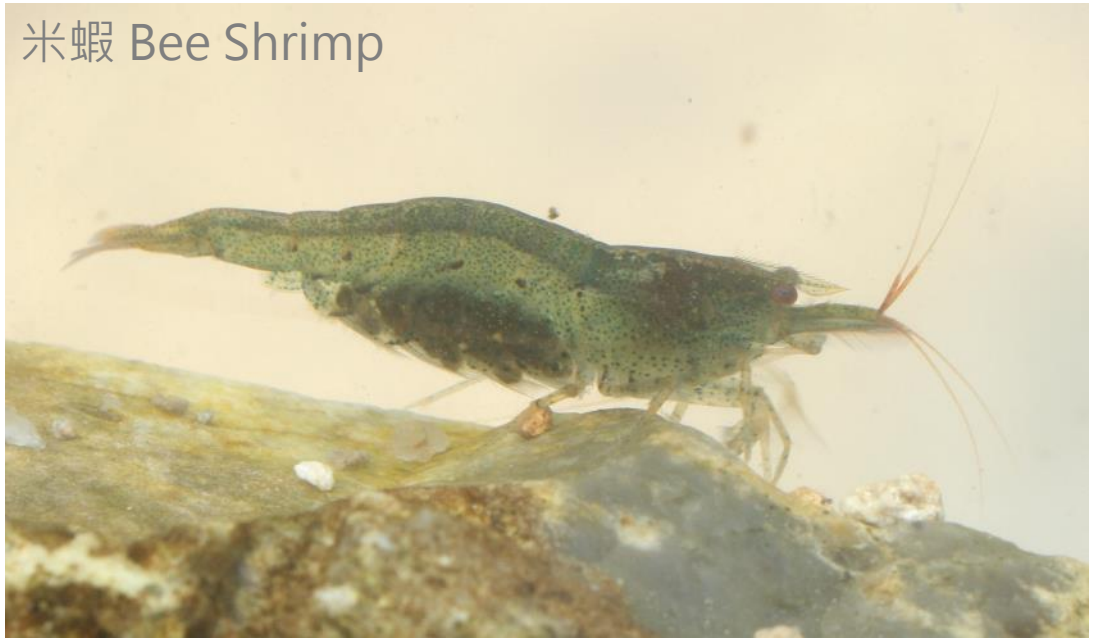


- 撕食者 shredders





- 收集者 collectors
  - 收集者—採集者 collector-gatherers
  - 濾食者 filter-feeders





- 捕食者 predators









混合食性 mixed feeding mode

收集者—刮食者 collector-scrapers

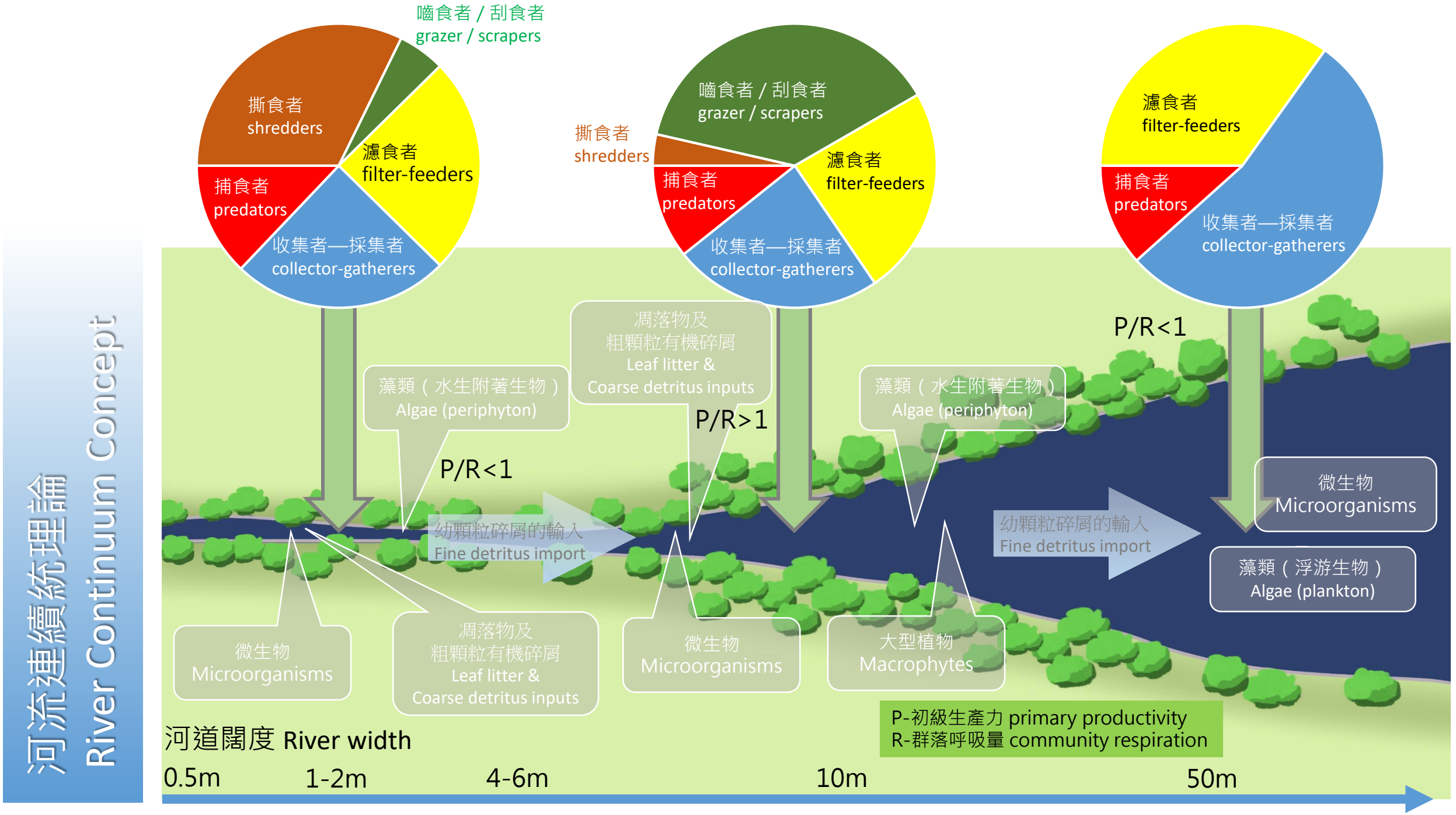
扁蜉 Flatheaded Mayfly



刮食者—捕食者 scraper-predators

擬平鰍 Broken-band Hillstream Loach




河流連續統理論
River Continuum Concept
嚙食者 / 刮食者
grazer / scrapers
撕食者
shredders
濾食者
filter-feeders
捕食者
predators
收集者—採集者
collector-gatherers
嚙食者 / 刮食者
grazer / scrapers
撕食者
shredders
濾食者
filter-feeders
捕食者
predators
收集者—採集者
collector-gatherers
濾食者
filter-feeders
捕食者
predators
收集者—採集者
collector-gatherers
週落物及
粗顆粒有機碎屑
Leaf litter &
Coarse detritus inputs
藻類（水生附著生物）
Algae (periphyton)
P/R<1
P/R>1
藻類（水生附著生物）
Algae (periphyton)
P/R<1
幼顆粒碎屑的輸入
Fine detritus import
幼顆粒碎屑的輸入
Fine detritus import
微生物
Microorganisms
藻類（浮游生物）
Algae (plankton)
微生物
Microorganisms
週落物及
粗顆粒有機碎屑
Leaf litter &
Coarse detritus inputs
微生物
Microorganisms
大型植物
Macrophytes
P-初級生產力 primary productivity
R-群落呼吸量 community respiration
河道闊度 River width
0.5m
1-2m
4-6m
10m
50m


沙田海
Tide Cove
馬鞍山
Ma On Shan
燕岩頂
Yin Ngam Teng
四方山
Sze Fong Shan
鉛礦坳
Lead Mine Pass
草山
Grassy Hill
大帽山
Tai Mo Shan
狗肚山
Kau To Shan
火炭
Fo Tan
沙田
Sha Tin
女婆山
Nui Po Shan
針山
Needle Hill
大圍
Tai Wai
水牛山
Buffalo Hill
葵涌
Kwai Chung
東涌山
Tung Yeung Shan
沙田坳
Sha Tin Pass
獅子山
Lion Rock

大城石澗

Tai Shing Stream

草城石澗

Tso Shing Stream

草城石澗河段的底棲動物（踢網採樣）

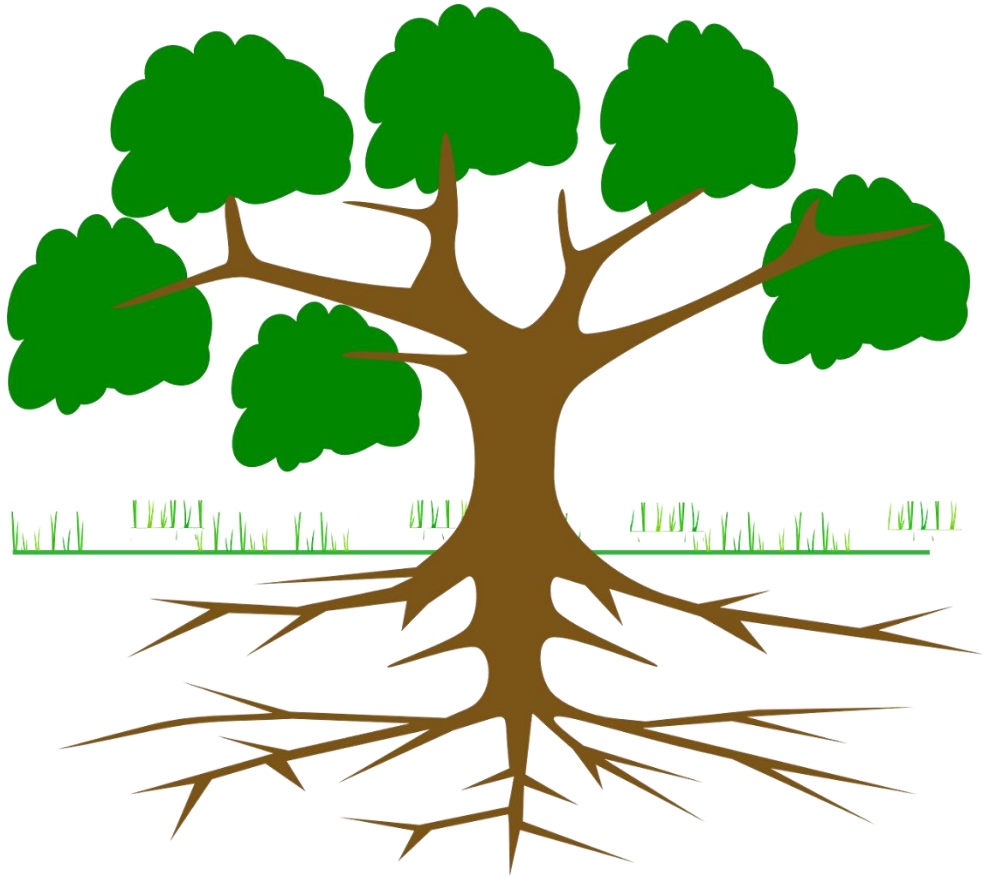
Benthic fauna in Tso Shing Stream (found by kick sampling)

60 spp.

分類Classification		學名Scientific name	中文俗名Chinese common name
蜉蝣目Ephemeroptera（蜉蝣Mayfly）			
	細裳蜉科Leptophlebiidae	*Choroterpes* spp.	寬基蜉
		Habrophlebiodes gilliesii	吉氏柔裳蜉
		Isca purpurea	
	蜉蝣科Ephemeridae	*Ephemera* spp.	蜉蝣
	小蜉科Ephemerellidae	*Ephemerellina* sp.	微蜉
		Serratella albostriata	鋸形蜉
	細蜉科Caenidae	*Caenis* spp.	細蜉
	鬚蜉科Prosopistomatidae	*Prosopistoma sinense*	
	寡脈蜉科Oligoneuriidae	*Isonychia kiangsiensis*	江西等蜉
	扁蜉科Heptageniidae	*Cinygmina* sp.	似動蜉
		Electrogena ngi	
		Epeorus sagittatus	高翔蜉
		Iron herklotsi	
		Paegnoides cupulatus	桶形贊蜉
	四節蜉科Baetidae	*Baetiella* spp.	
		Baetis spp.	四節蜉
		Cloeodes longisetosus	
		Liebebiella vera	
		Platybaetis bishopi	
		indet. sp.	（未定種）
蜻蜓目Odonata（豆娘和蜻蜓Damselfly and Dragonfly）			
	溪蟌科Euphaeidae	*Euphaea decorata*	方帶幽蟌
	扁蟌科Platystictidae	*Protosticta taipokauensis*	白瑞原扁蟌
	春蜓科Gomphidae	*Heliogomphus scorpio*	獨角曦春蜓
		Ophiogomphus sinicus	中華長鉤春蜓
	蜻科Libellulidae	*Zygonyx iris*	彩虹蜻
襀翅目Plecoptera（石蠅Stonefly）			
	卷石蠅科Leuctridae	*Leuctra* sp.	
	短尾石蠅科Nemouridae	indet. sp.	（未定種）
	石蠅科Perlidae	indet. sp.	（未定種）
廣翅目Megaloptera（魚蛉Fishfly）			
	齒蛉科Corydalidae	indet. sp.	（未定種）
鞘翅目Coleoptera（甲蟲Beetle）			
	龍虱科Dytiscidae	*Hydrovatus* sp.	
		indet. sp.	（未定種）
	沼甲科Scirtidae	indet. sp.	（未定種）
	水龜甲科Hydrophilidae	*Berosus* spp.	
		Enochrus spp.	
		indet. sp.	（未定種）
	扁泥甲科Psephenidae	*Eubrianax* spp.	
		Mataeopsephus chinensis	
		Psephenoides sp.	扁泥甲
	擎爪泥甲科Eulichadidae	*Eulichas dudgeoni*	擎爪泥甲
	溪泥甲科Elmidae	indet. sp.	（未定種）
雙翅目Diptera（Truefly）			
	大蚊科Tipulidae	*Hexatoma* sp.	
	蚋科Simuliidae	*Eusimilum* sp.	真蚋
	蠓科Ceratopogonidae	indet. sp.	（未定種）
毛翅目Trichoptera（石蛾Caddisfly）			
	原石蛾科Rhyacophilidae	*Himalopsyche* sp.	喜馬原石蛾
		Rhyacophila perforata	原石蛾
	紋石蛾科Hydropsychidae	*Cheumatopsyche spinosa*	蛇尾短脈紋石蛾
		Cheumatopsyche ventricosa	圓尾短脈紋石蛾
		Hydropsyche sp.	紋石蛾
		Macrostemum fastosum	長角紋石蛾
	舌石蛾科Glossosomatidae	*Agapetus* sp.	魔舌石蛾
	角石蛾科Stenopsychidae	*Stenopsyche augustata*	狹窄角石蛾
	多距石蛾科Polycentropodidae	*Chimarra* spp.	缺叉等翅石蛾
		Polycentropus sp.	多距石蛾
		Pseudoneureclipsis sp.	
	徑石蛾科Ecnomidae	*Ecnomus* sp.	徑石蛾
	劍石蛾科Xiphocentronidae	*Melanotrichia serica*	劍石蛾
	枝石蛾科Calamoceratidae	*Anisocentropus maculatus*	多斑枝石蛾
	齒角石蛾科Odontoceridae	*Psilotreta kwangtungensis*	廣東裸齒角石蛾
	鉤翅石蛾科Helicopsychidae	*Helicopsyche* sp.	
新進腹足目Caenogastropoda（螺Snail）			
	錐蜷科Thiaridae	*Brotia hainanensis*	海南蜷螺



落葉
Leaf litter



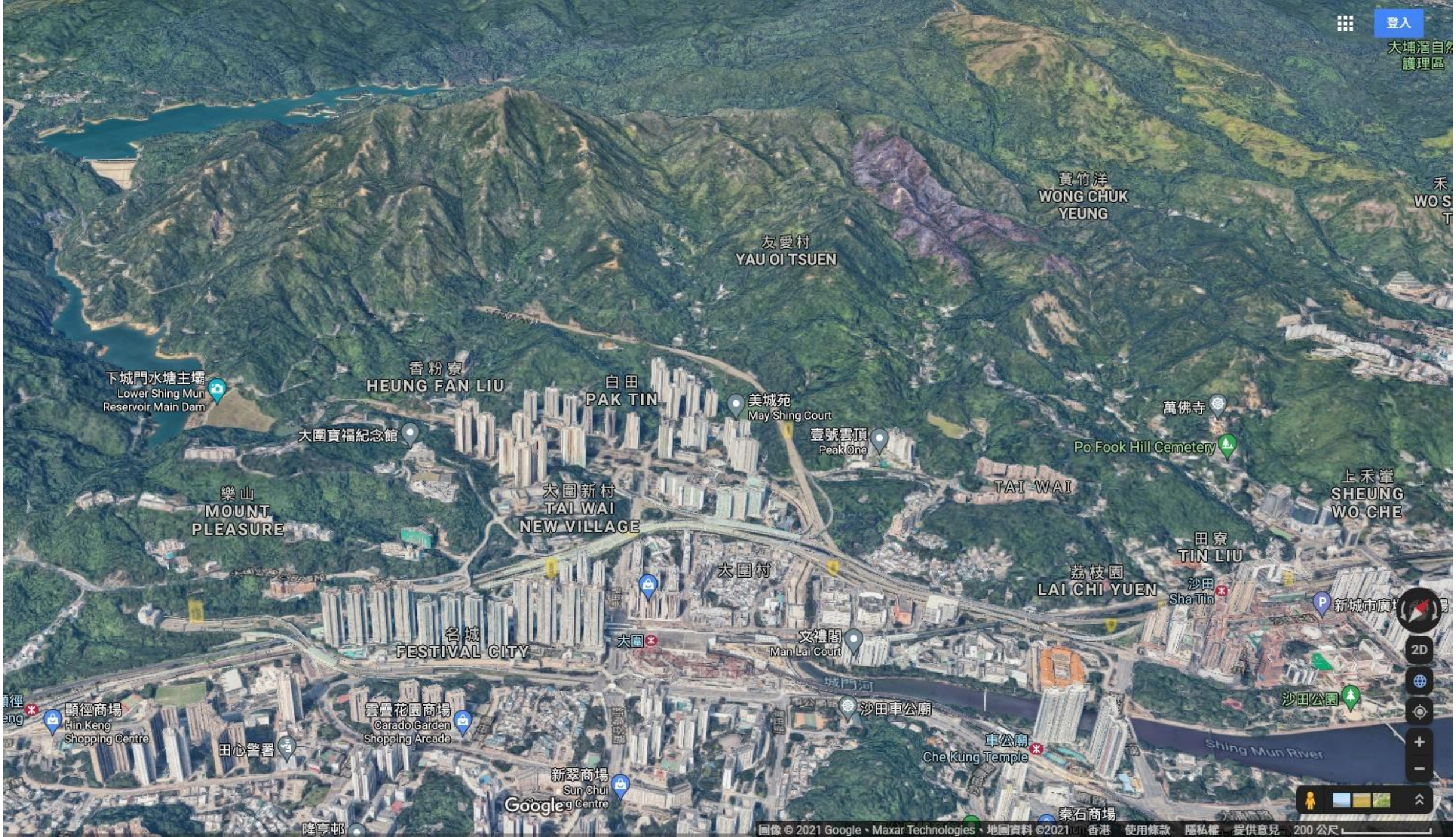
微生境
Micro-
habitat

鞏固泥土
Consolidate
the soil

林蔭
Shading






登入
大埔滘自然護理區
黃竹洋
WONG CHUK YEUNG
禾
WO S
T
友愛村
YAU OI TSUEN
香粉寮
HEUNG FAN LIU
白田
PAK TIN
下城門水塘主壩
Lower Shing Mun Reservoir Main Dam
美城苑
May Shing Court
萬佛寺
大圍寶福紀念館
壹號雲頂
Peak One
Po Fook Hill Cemetery
TAI WAI
上禾輋
SHEUNG WO CHE
樂山
MOUNT PLEASURE
大圍新村
TAI WAI NEW VILLAGE
田寮
TIN LIU
大圍村
荔枝園
LAI CHI YUEN
沙田
Sha Tin
新城市廣場
名城
FESTIVAL CITY
大圍
文禮閣
Man Lai Court
2D
沙田車公廟
沙田公園
顯徑商場
Hin Keng Shopping Centre
雲疊花園商場
Carado Garden Shopping Arcade
車公廟
Che Kung Temple
田心警署
Shing Mun River
新翠商場
Sun Chui Shopping Centre
Google
索石商場
圖像 © 2021 Google、Maxar Technologies、地圖資料 ©2021 香港 使用條款 隱私權 提供意見 200 公尺



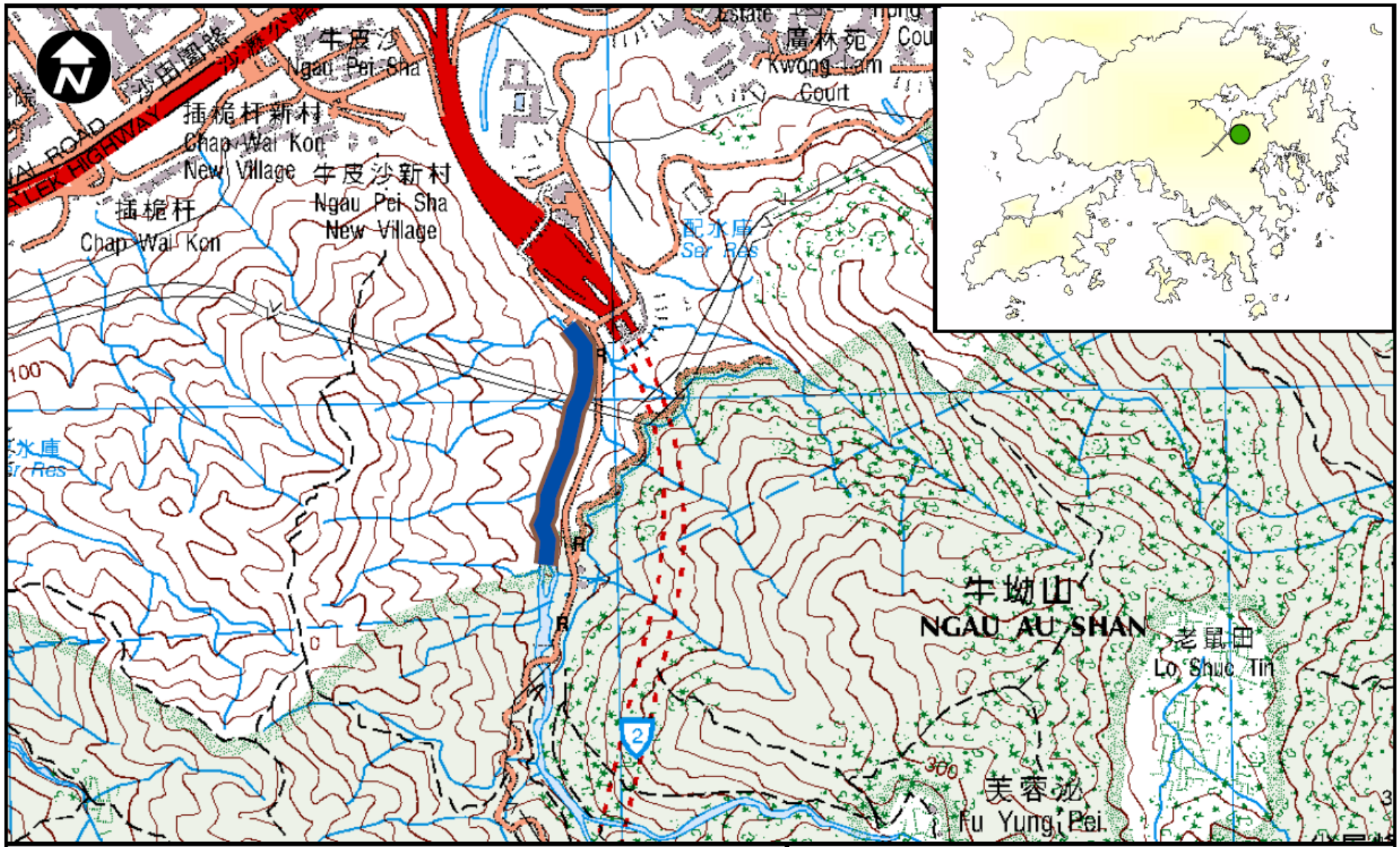



沙田海
Tide Cove
馬鞍山
Ma On Shan
燕岩頂
Yin Ngam Teng
四方山
Sze Fong Shan
鉛礦坳
Lead Mine Pass
草山
Grassy Hill
大帽山
Tai Mo Shan
狗肚山
Kau To Shan
火炭
Fo Tan
沙田
Sha Tin
女婆山
Nui Po Shan
針山
Needle Hill
大圍
Tai Wai
水牛山
Buffalo Hill
葵涌
Kwai Chung
東涌山
Tung Yeung Shan
沙田坳
Sha Tin Pass
獅子山
Lion Rock

馬麗口坑

Ma Lai Hau Hang





Ecologically Important Stream at Ma Lai Hau Hang

0 55 110 220 330 440 Meters

Scale 1:8000

Agriculture, Fisheries and Conservation Department

水泉澳

Shui Chuen O



花心坑
Fa Sam Hang



本地溪流生物
Local Stream Organisms



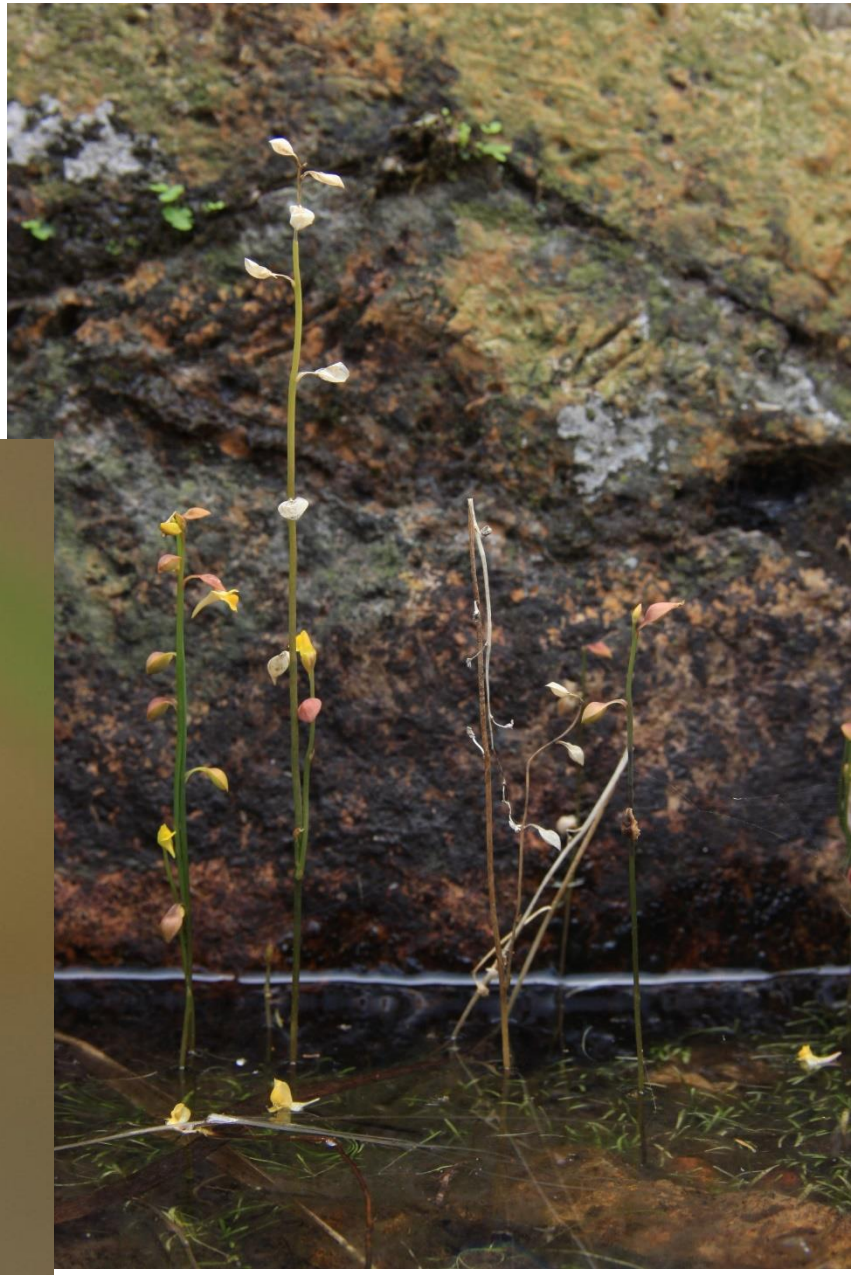
蘚

Moss

狸藻

Bladderworts





寬苞茅膏菜

Spoon Leaf Sundew





豬籠草

Pitcher Plant





石菖蒲

Grass-leaved Sweet Flag





海芋

Giant Alocasia

海南溝蜷

Large Stream Snail



香港南海溪蟹 Hong Kong Freshwater Crab



沼蝦 Long-armed Shrimp





米蝦

Bee Shrimp

蜉蝣 Mayfly





蜻蜓 Dragonfly





豆娘 Damselfly





© Henry Lui

石蠅 Stonefly





石蛾 Caddisfly







仰蝽 Backswimmer



黽蝽 Water Skater







扁泥甲

Water Penny

魚 Fish







兩棲類（蛙及瘰螈）
Amphibian (Frog and Newt)



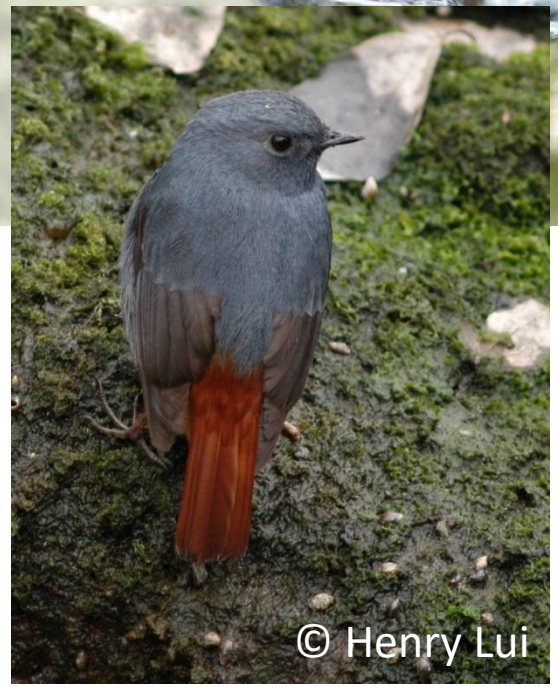


鳥類 Bird











招潮蟹 Fiddler Crab



水鳥Waterbirds



© Henry Lui

獴 Mongoose



© Henry Lui













Workshop-cum-Guided field-trip to Shing Mun River Catchment



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Mr Anthony Yeung & Ms Alice Cho
Hong Kong Geographical Association

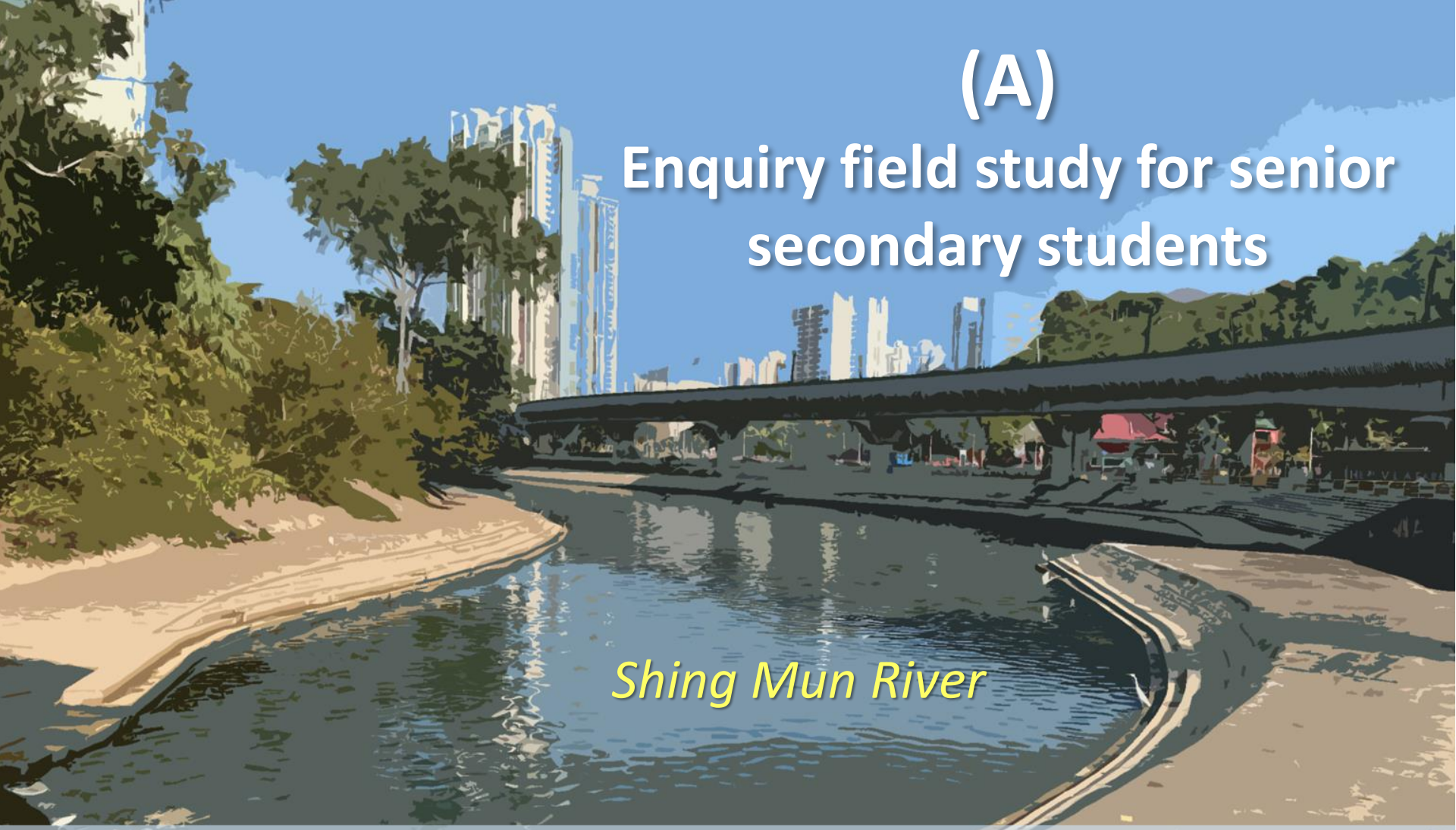
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Workshop-cum-Guided field trip to Shing Mun River Catchment

(A) Enquiry field study for senior secondary students

(B) Enquiry field studies for junior secondary students: (1) & (2)

(A)
Enquiry field study for senior secondary students



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Water Initiative on Sustainability and Engagement
賽馬會惜水・識河計劃

Ms. Alice Cho

Hong Kong Geographical Association

HKGA

Enquiry Question

Dissolved oxygen is regarded as an important indicator of water quality. Evaluate the validity of the following statement:

"Dissolved oxygen level in a channelised watercourse is generally lower than that in a natural stream."





Concepts

1 Objectives of river management strategies

Tai Wai Nullah: Flood control (since 1970) VS Ecological enhancement (revitalization plan 2024-29)

2 River characteristics

Stream flows into Upper Shing Mun River (natural stream) VS Tai Wai Nullah (channelised watercourse)





3 Water quality related to hard engineering strategies

Dissolved oxygen level

Field Study Sites

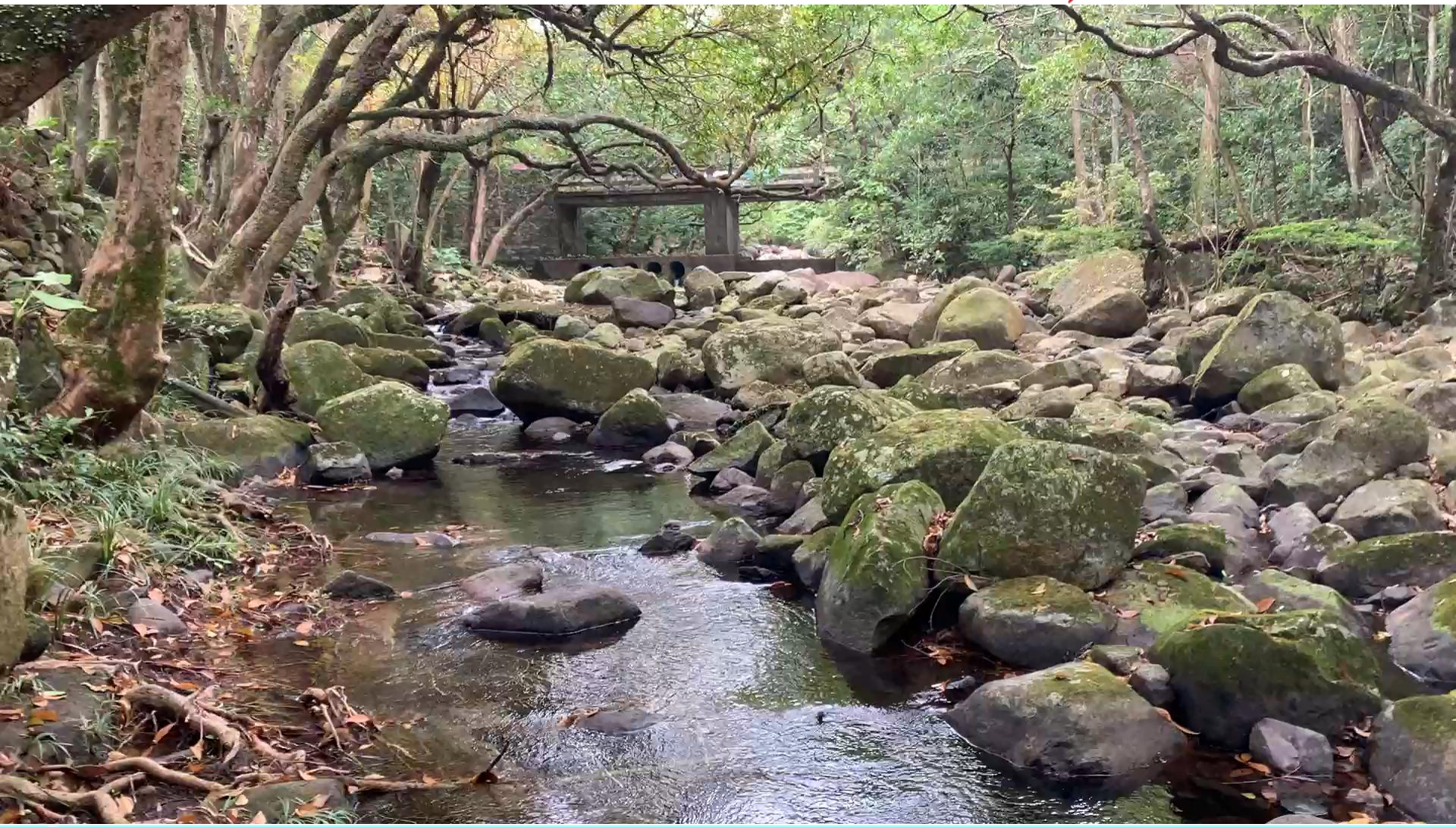


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A

Tai Shing Stream
大城石澗



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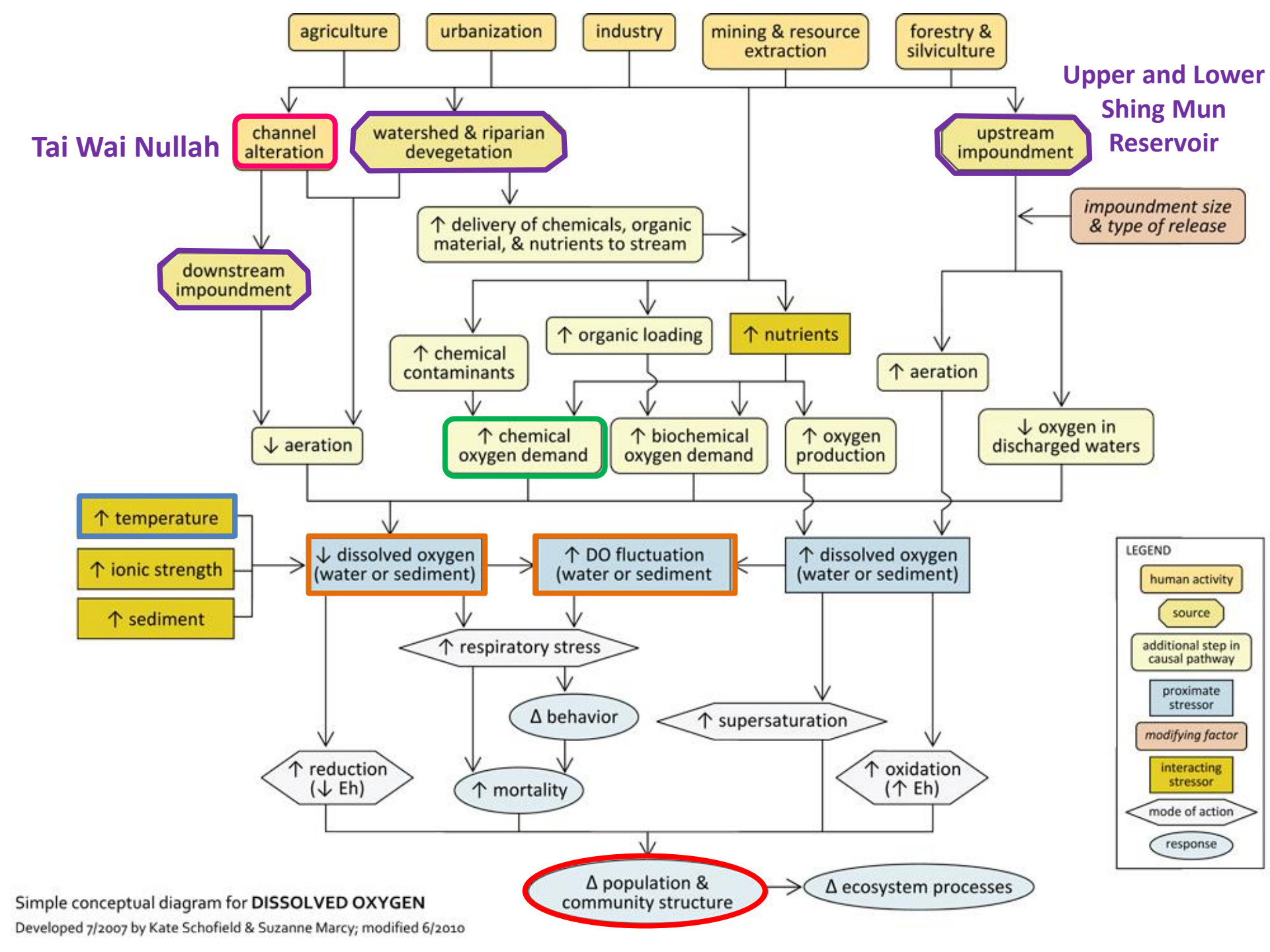
B

Stream across Pineapple Dam Nature Trail
橫過菠蘿壩自然教育徑之溪流



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Simple conceptual diagram for **DISSOLVED OXYGEN**

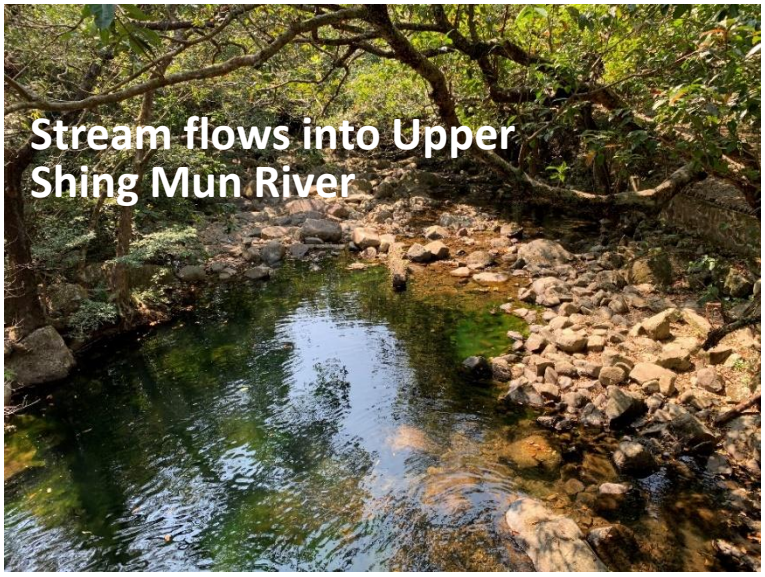
Developed 7/2007 by Kate Schofield & Suzanne Marcy; modified 6/2010

➢ By Observation

Channel Appearance and the Surrounding Environment

pp. 27, 30

- Channel width
- Shape of river bank
- River bed material
- Water depth
- Type of stream flow
- Channel gradient
- Surrounding environment





DATA COLLECTION—Part II

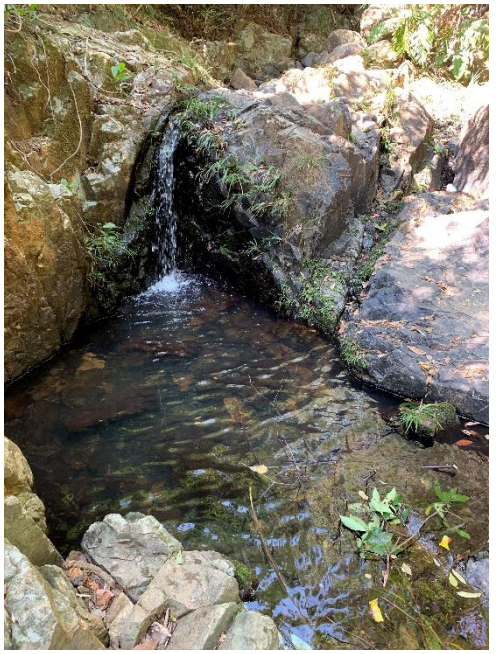
➢ By Measurement

Water Quality

p. 27, 31-37

- Air temperature (˚C)
- Water temperature (˚C)
- Dissolved oxygen level (mg/L)
- Chemical oxygen demand (mg/L)
- Conductivity (ppm)
- Salinity (ppt or ‰)









Instruments

Electronic instrument measurement



Dissolved oxygen meter



Salinity meter



Conductivity meter



Digital thermometer



Colorimetric





Chemical oxygen demand (COD) rapid test kit



Water monitoring kit

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Chemical Oxygen Demand (COD) test



❑ Choose appropriate instruments (pros & cons):

- electronic measuring instruments VS rapid test kits (colorimetric)

❑ Precautions when operating the instruments

❑ Choose the right timing of data collection:

- sunny day VS cloudy day
- high tide VS low tide
- morning VS noon
- synchronize data collection at different sites

Extended Learning



‘Revitalization of Tai Wai Nullah’ project announced in July 2019

Perspectives of the revitalization project from Drainage Service Department



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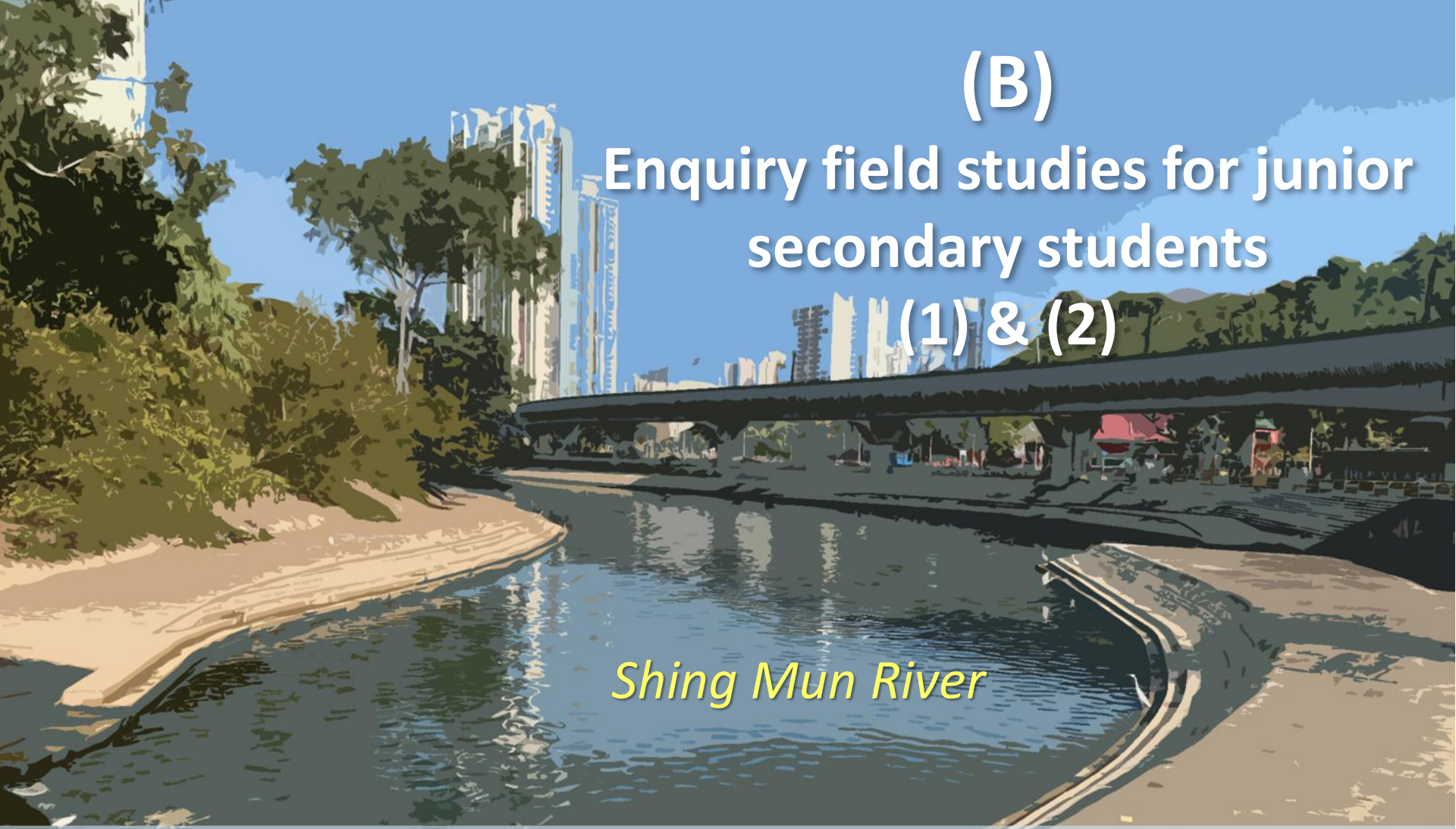
References

- United States Environmental Protection Agency (EPA). *Simple conceptual diagram for dissolved oxygen* [Diagram]. Retrieved from https://www.epa.gov/sites/production/files/2015-11/do-cd_sim_1000_0.jpg

- Drainage Services Department (Aug 2015). *Guidelines on Environmental and Ecological Considerations for River Channel Design* (Drainage Services Department Practice Note No. 1/2015, Version No. 1). Retrieved from https://www.dsd.gov.hk/EN/Files/Technical_Manual/dsd_TechCirculars_n_PracticeNotes/DSDPN_201501.pdf

- Drainage Services Department (Jul 2019). *Project Profile for Revitalisation of Tai Wai Nullah*. Retrieved from https://www.epd.gov.hk/eia/register/profile/latest/esb320/esb320.pdf

- Topick.hket.com (2019, Oct 9). *大圍明渠活化 市區首條「親水」渠.* Retrieved from https://topick.hket.com/article/2467727/%E5%A4%A7%E5%9C%8D%E6%98%8E%E6%B8%A0%E6%B4%BB%E5%8C%96%E3%80%80%E5%B8%82%E5%8D%80%E9%A6%96%E6%A2%9D%E3%80%8C%E8%A6%AA%E6%B0%B4%E3%80%8D%E6%B8%A0



(B)
Enquiry field studies for junior secondary students (1) & (2)

Shing Mun River

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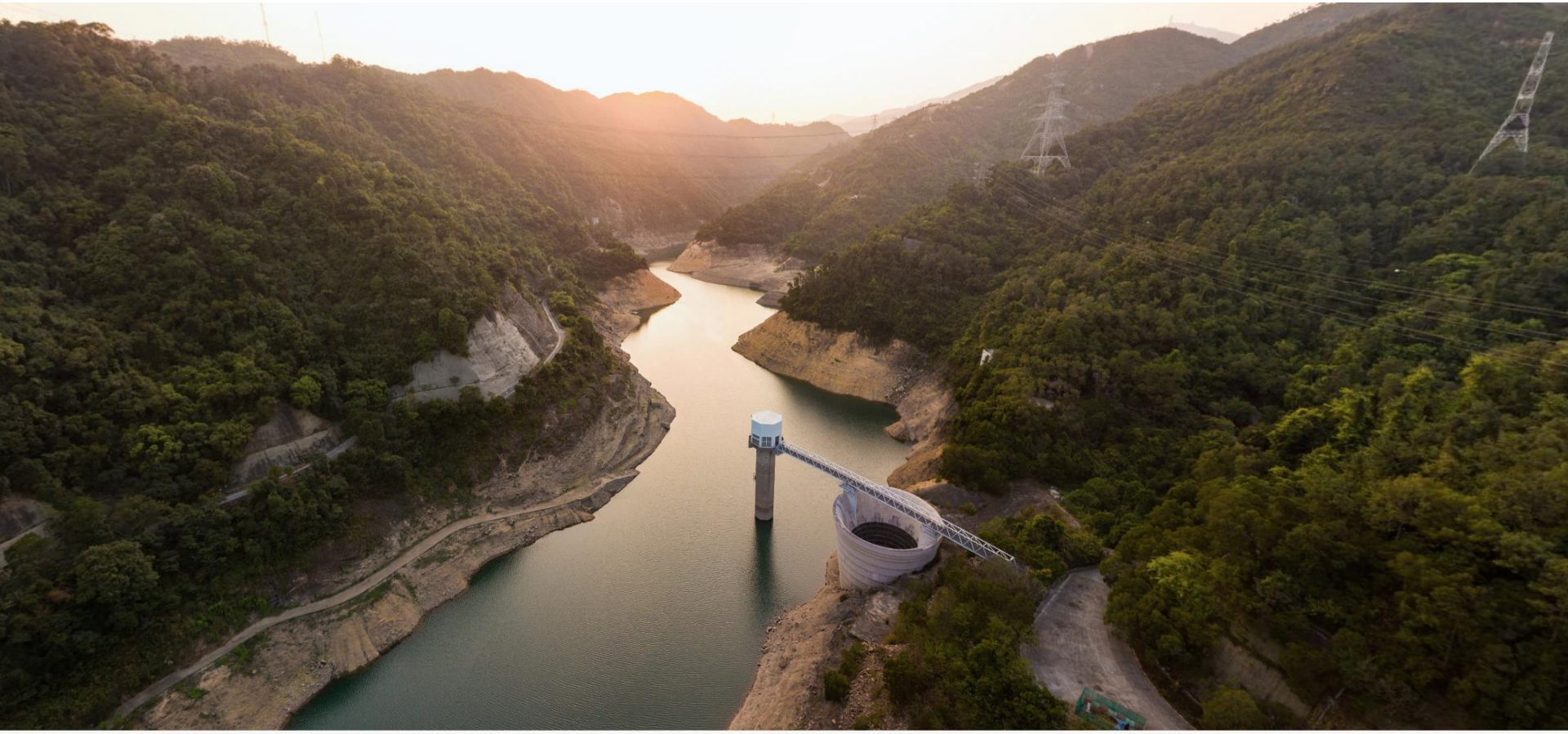
Mr. Anthony Yeung

Hong Kong Geographical Association

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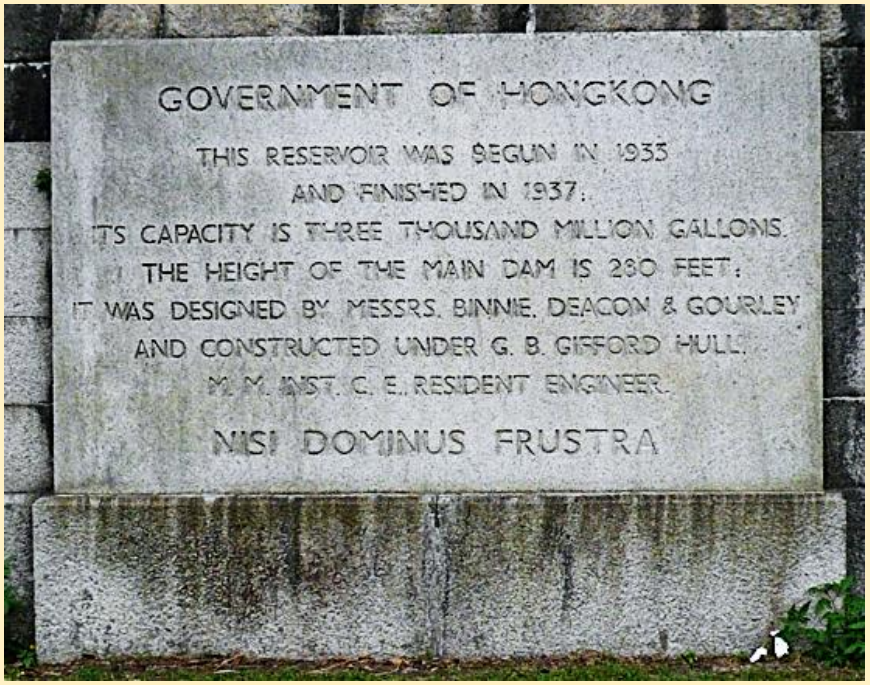
Enquiry Question (1)

"Why was Shing Mun River valley chosen for the construction of a reservoir?"



Shing Mun Reservoir

- The **Shing Mun Reservoir** was built as part of the Shing Mun Water Supply Scheme to meet the increasing demand for freshwater due from Kowloon.
- Construction began in 1933 and finished in 1937. The reservoir was once popularly known as the **Jubilee Reservoir** to celebrate the Silver Jubilee (1935) of King George V.
- The **dam** is 85 metres in height and had a capacity of 13.6 billion litres.



Lower Shing Mun Reservoir

Built: 1965



Gorge Dam

Introduce students the concept of **GORGE**:

A ***gorge*** is a narrow valley with steep, rocky walls located between hills or mountains.

"Why was Shing Mun River valley chosen for the construction of a reservoir?"

"Locational advantages in topography"

Find out the characteristics of the Shing Mun River valley.

- *Broad or narrow valley?*
- *Steep or gentle valley sides?*
- *Straight or meandering valley?*

"Distance to consumers"

How far is Shing Mun away from urban Kowloon?

- *Map measurement: distance from shing Mun to Kowloon*

Relevance to the S1-3 Geography Curriculum

- **The Trouble of Water – Too much & too little**
  - What can be done to solve the water problem?
    - … The Three Gorges Dam Project …



    - **Damming the river valley –** Damming Shing Mun R Valley

- Simple **landform** study:
  - Valley
  - Spur

- **Map reading skills**
  - Contours

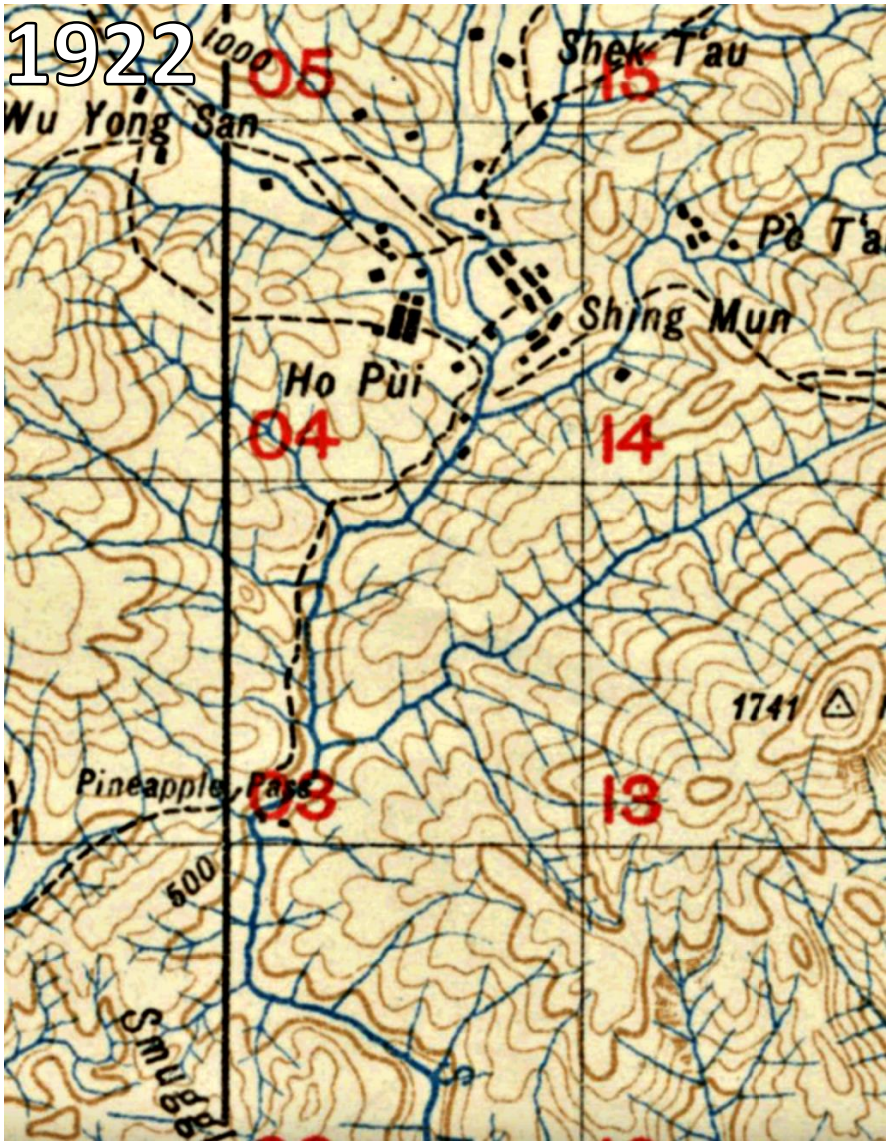
Similarities & differences between the damming of

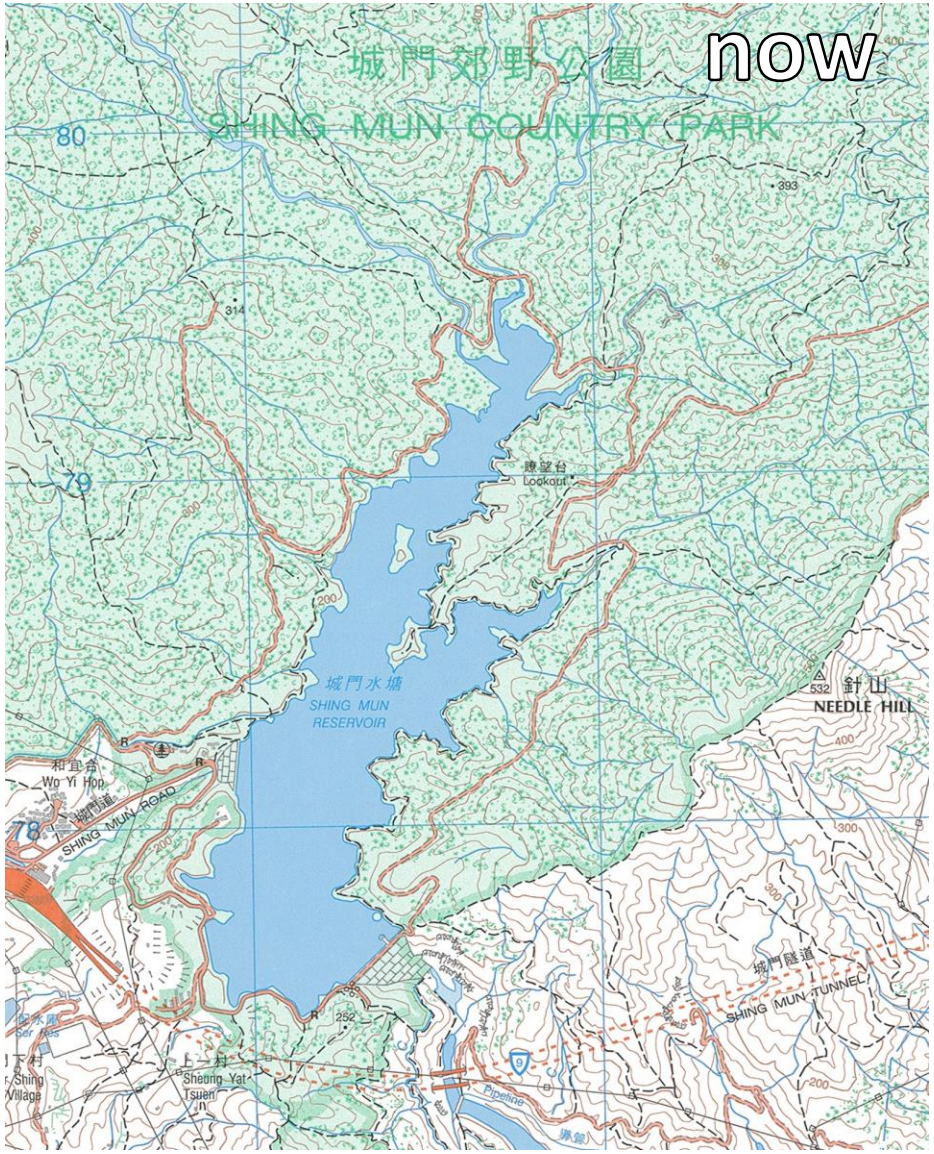
- Changjiang &
- Shing Mun River

Field Study Site

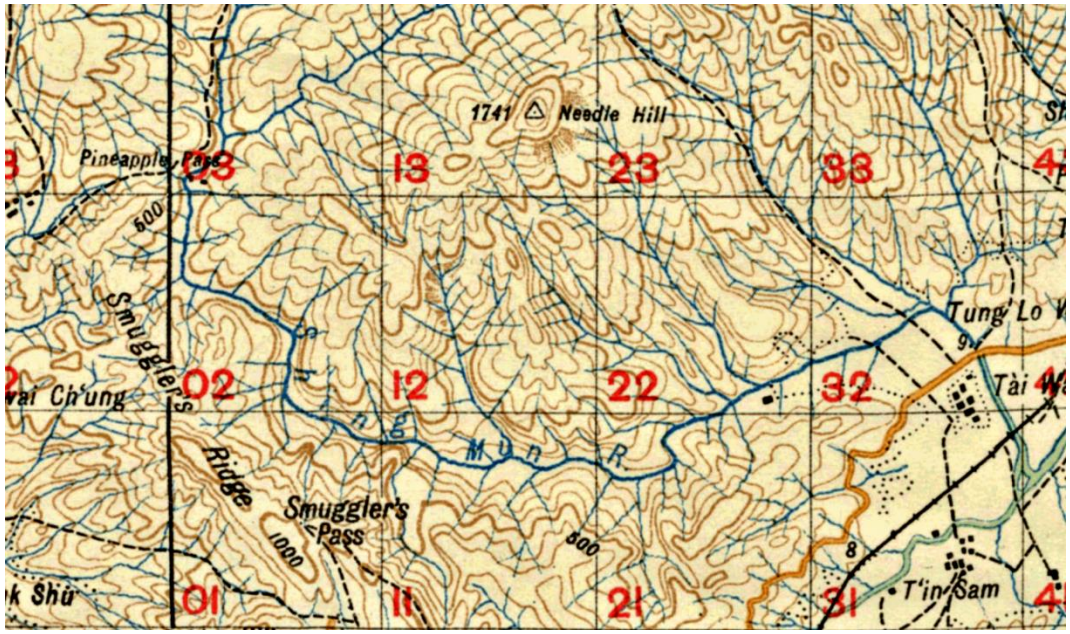


Upper Shing Mun Reservoir



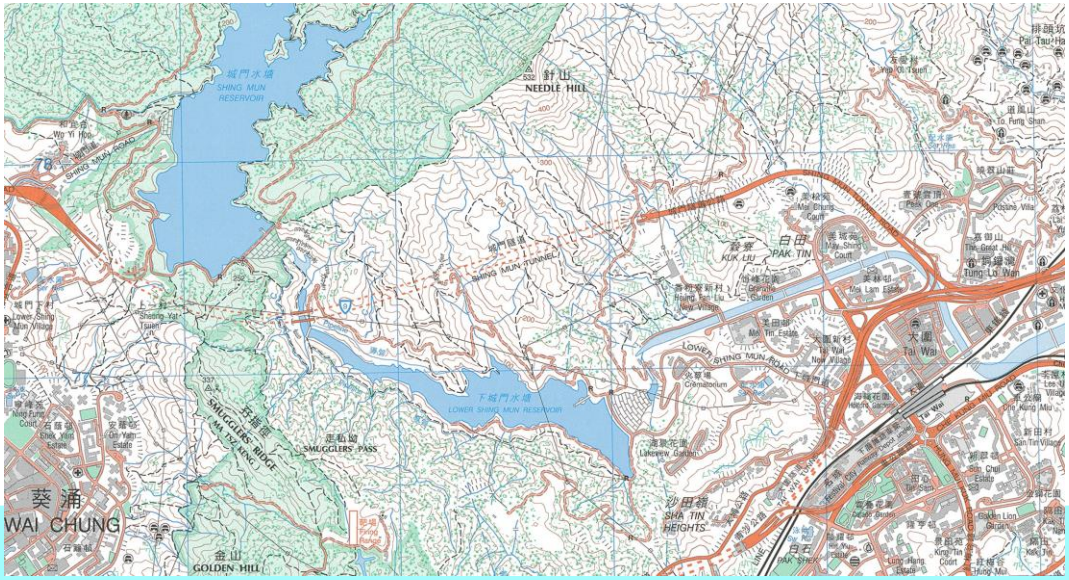


Lower Shing Mun Reservoir



1922

now

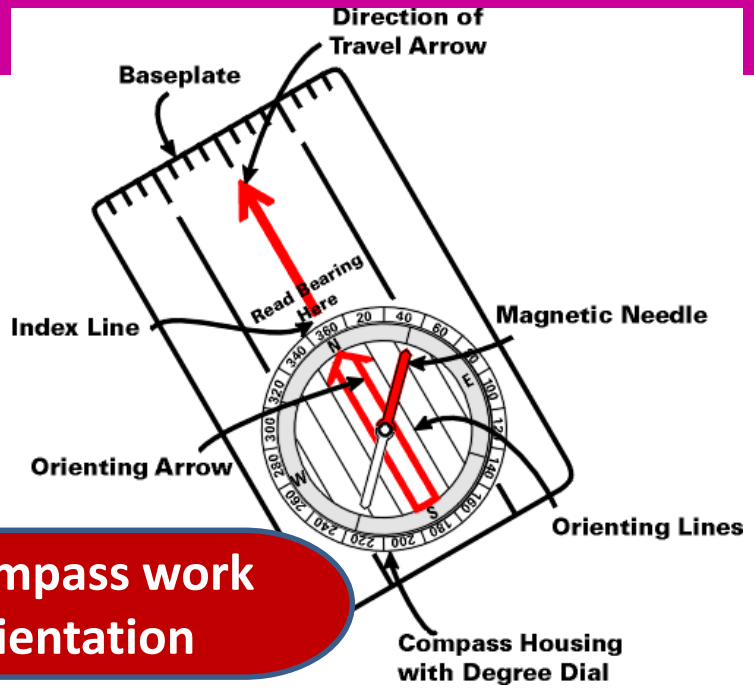


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Fieldwork Skills

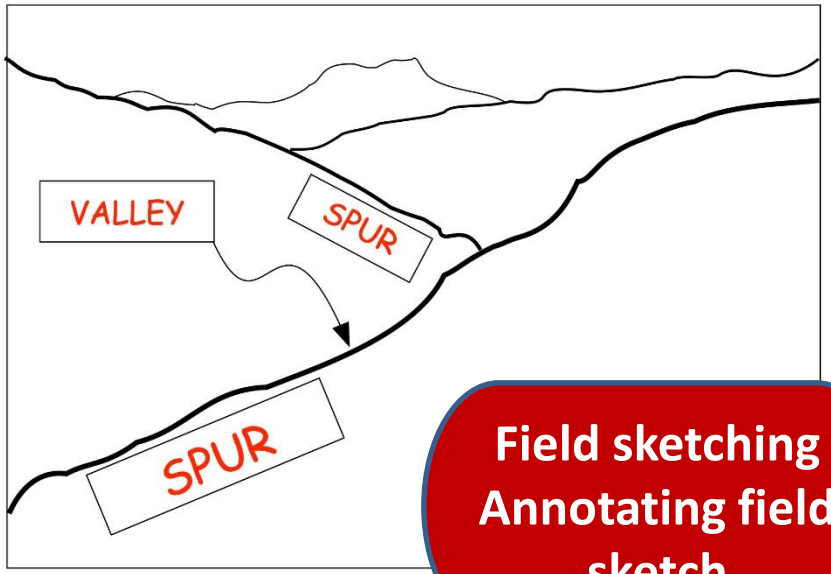




Map & compass work
Map orientation



Photo-taking



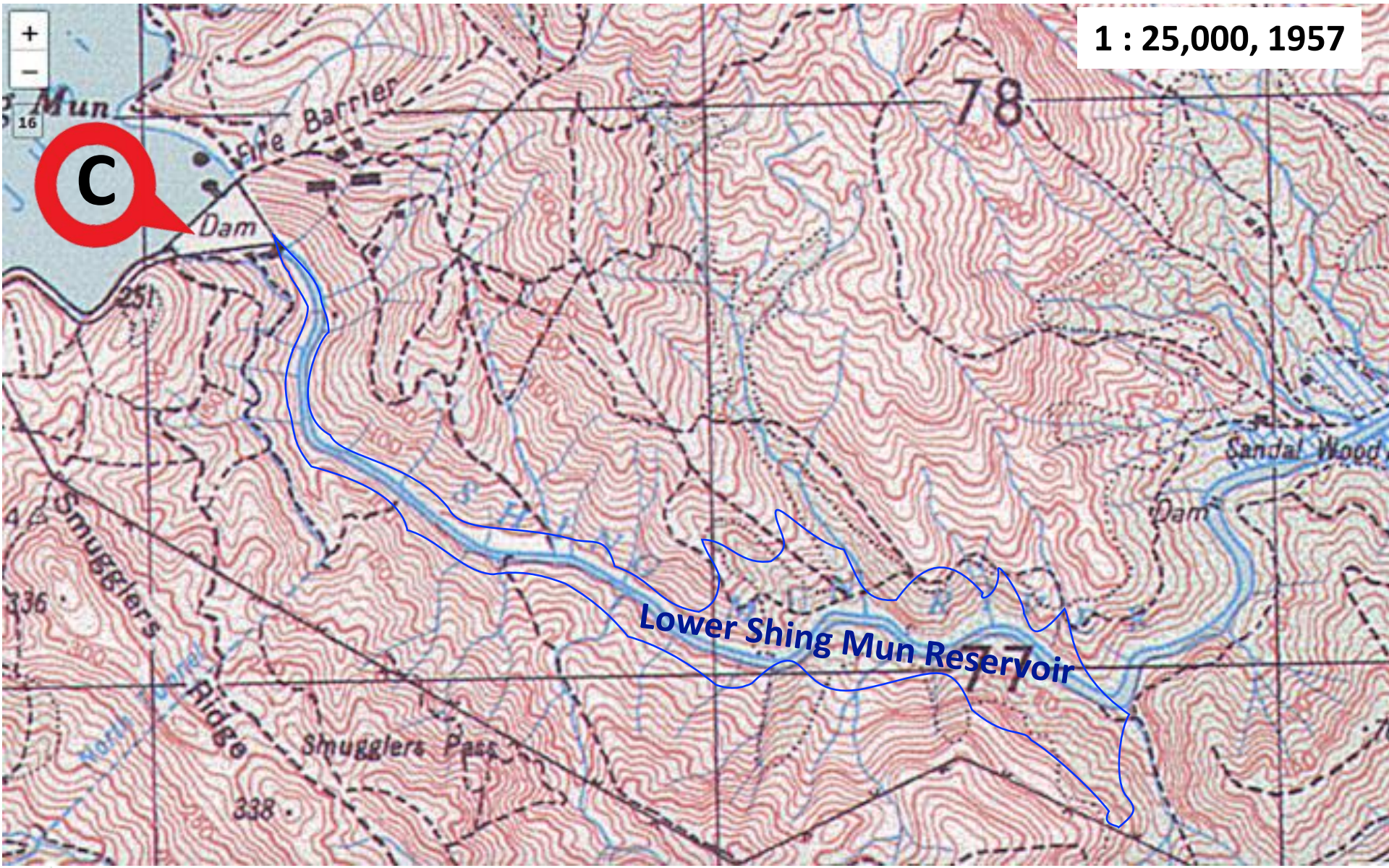
Field sketching
Annotating field sketch

Secondary data (with reference to Lower Shing Mun Reservoir)

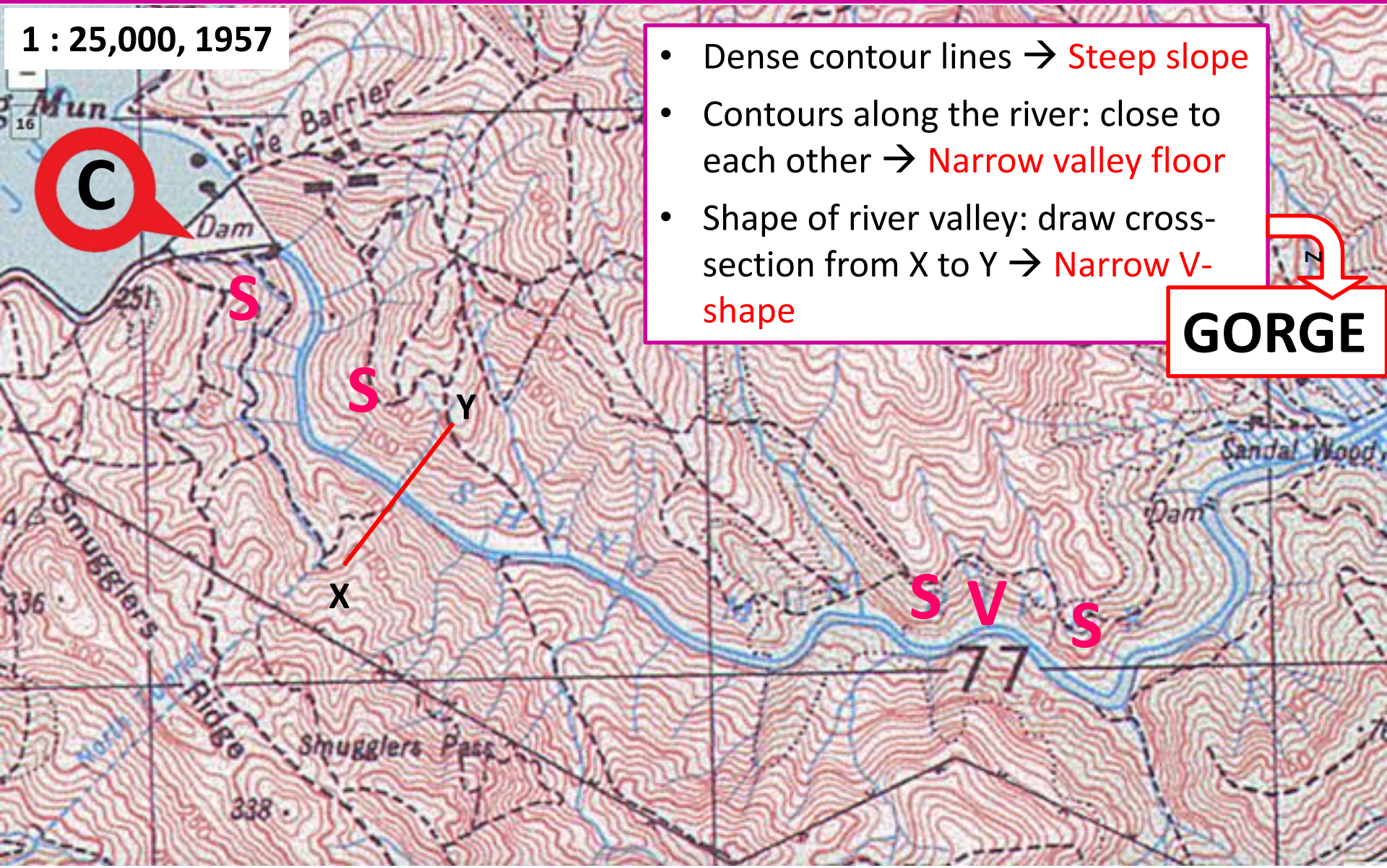
- Old Hong Kong topographic maps (contour maps)
  - Before the construction of Shing Mun Reservoir / Lower Shing Mun Res.
  - www.hkmaps.hk (Year 1922, 1952, 1957, 1962



Secondary data – before the construction of lower Shing Mun Reservoir

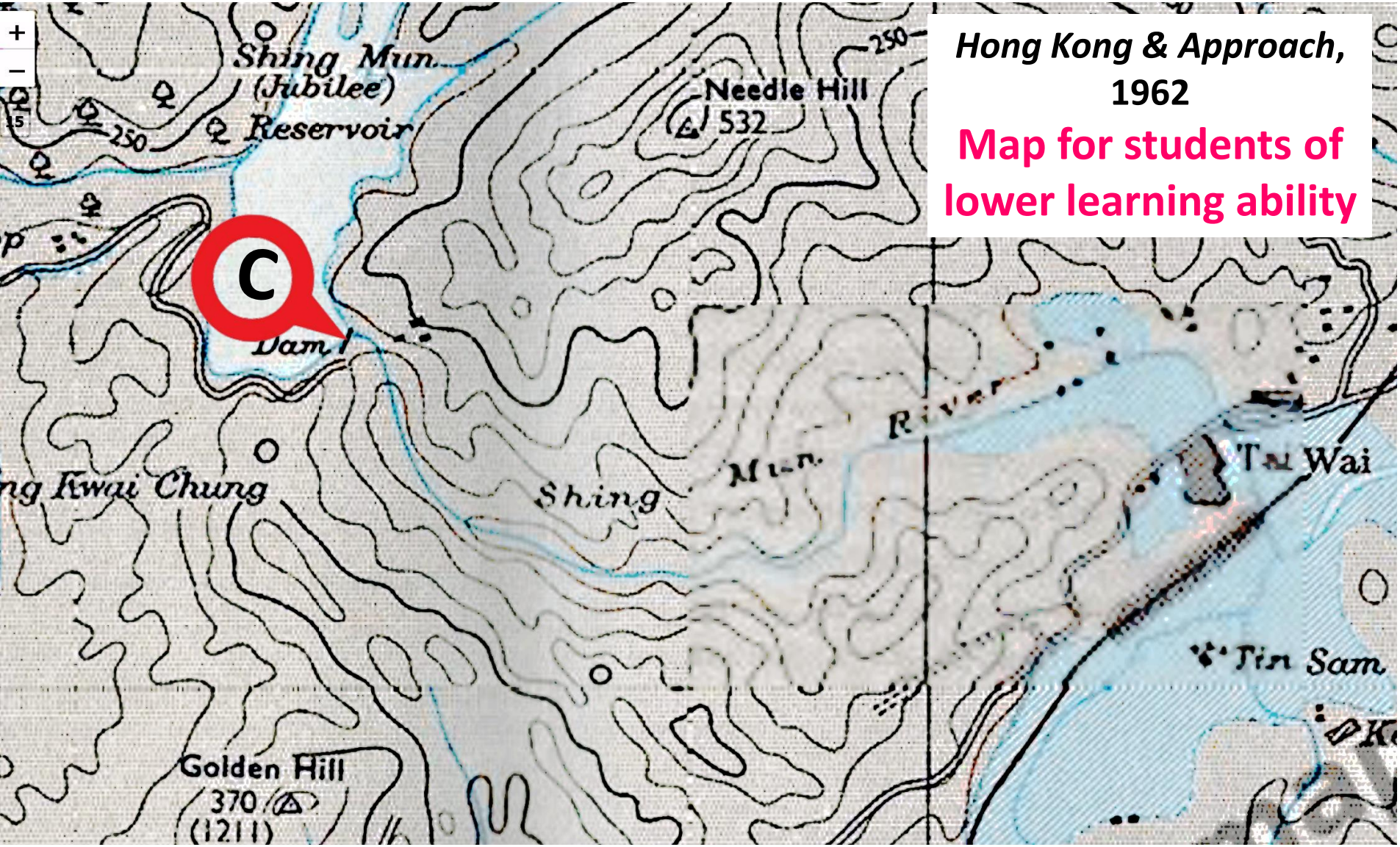


Secondary data – before the construction of lower Shing Mun Reservoir



- Dense contour lines → Steep slope
- Contours along the river: close to each other → Narrow valley floor
- Shape of river valley: draw cross-section from X to Y → Narrow V-shape

Secondary data – before the construction of lower Shing Mun Reservoir



Hong Kong & Approach, 1962

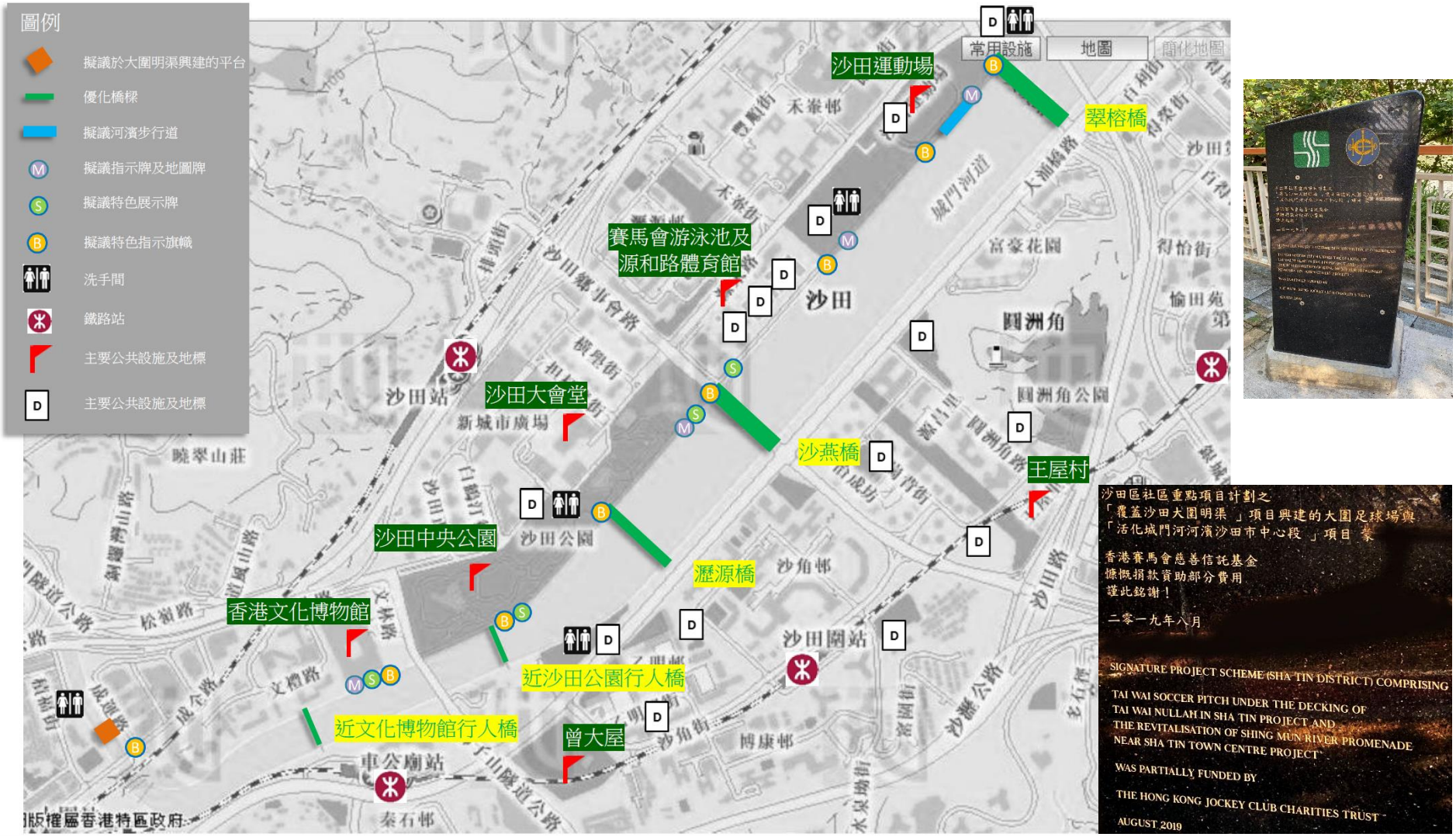
Map for students of lower learning ability

How does Shing Mun River channel benefit the Hong Kong society?



Enquiry Question (2)

How does Shing Mun River channel benefit the HK society?



〈沙田區議會地區設施管理委員會社區重點項目計劃(沙田區)——活化城門河河濱沙田市中心段——改善河濱展示設施〉，沙田區議會討論文件（文件：DFM21/2015），2015年6月23日。

What data to collect



Recreational facilities along the channel

Evidence of non-recreational function of the channel

Age of interviewees

Purpose of interviewees visiting the river

Frequency of visit by interviewees to the river

Suggestions to improve the present function of the river channel

Where and how to collect data

- Work in groups of 2-4 students
- Walk along two channel banks
- With observation and interview



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DATA COLLECTION—Part I

➢ By Observation

Facilities along the channel and embankment











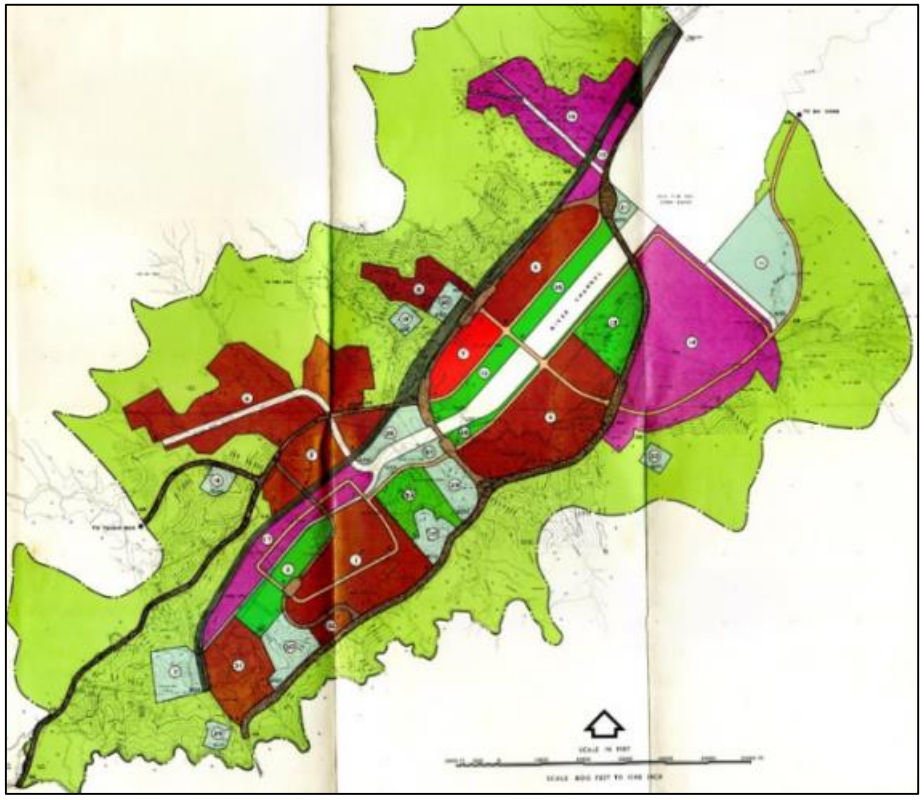
DATA COLLECTION—Part II

➢ By Interview (with questionnaires)



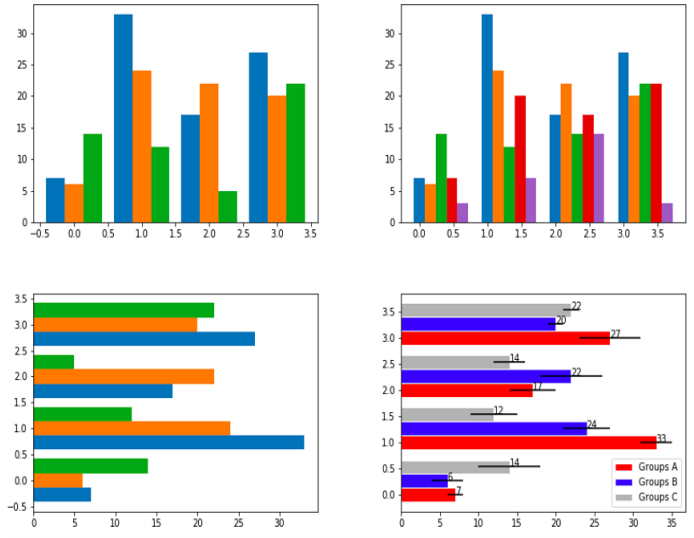
- Age group
- Purposes of visit
- Frequency of visit
- Suggestion for improvement

➢ Draw distribution of recreational facilities



➢ Draw grouped bar graphs

- Purposes of visit
- Frequency of visit
- Strategies for improvement

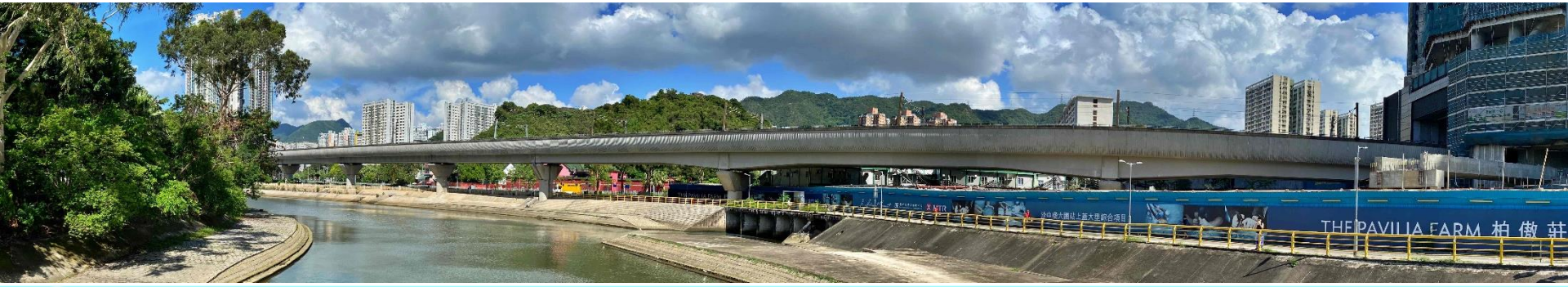


Questions to discuss

1. What benefits does Shing Mun River channel provide to Hong Kong people? Support your answers with evidences.

2. Describe the pattern people using the channel as a resource?
   Which age groups do the common users belong to?
   How frequent do they visit the channel?

3. What improvements on this channel resource do the users expect?
   Which have the greater demand? Will they be sustainable?




Thank you!
Shing Mun River