

My River, My Community

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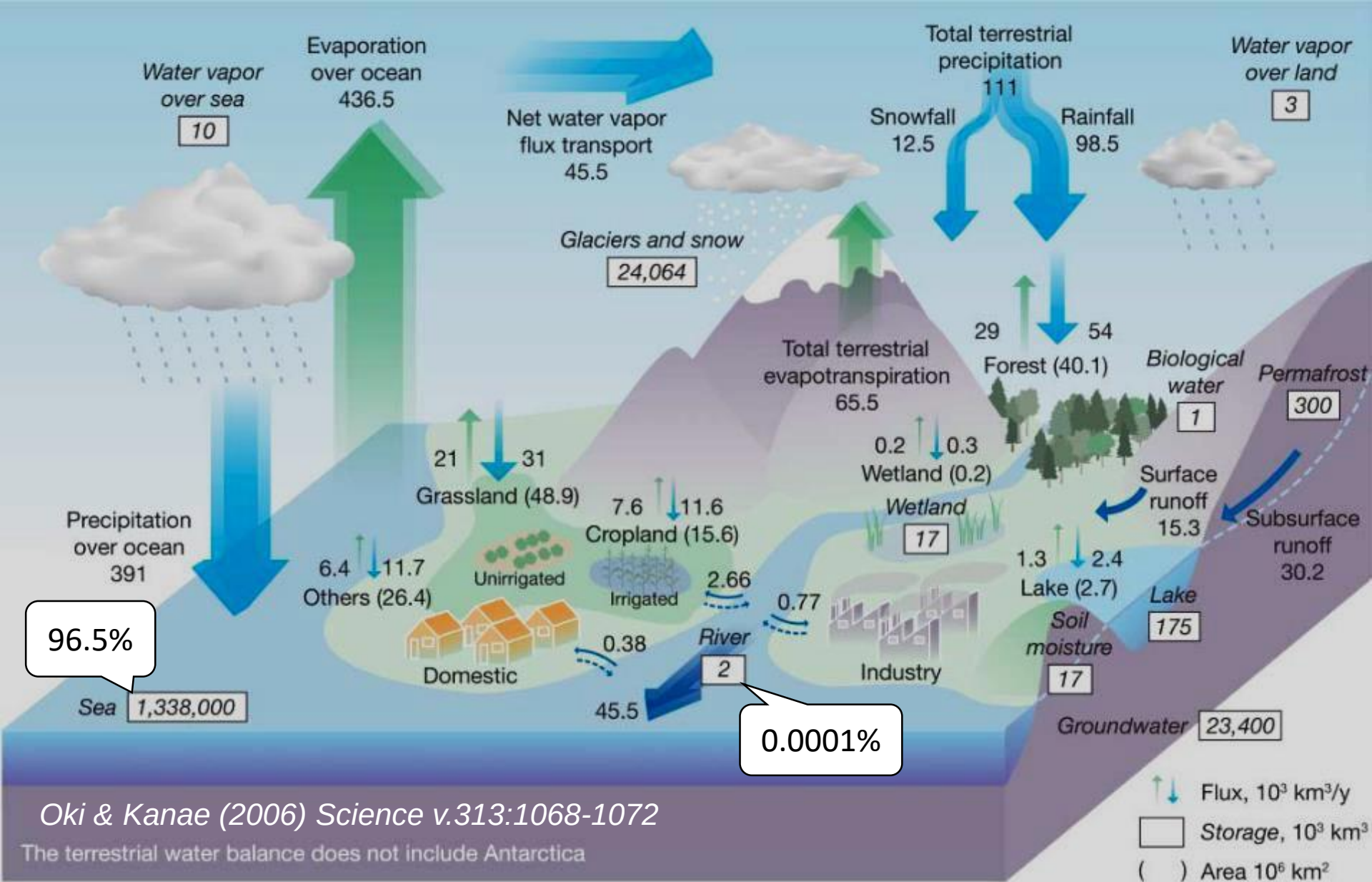


19.01.88 Oblique aerial photo © Lands Dept. HKSAR



Outline

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



Global Water Cycle

Storage	Volume [10 ³ km ³]	Flux [10 ³ km ³ /yr]	Residence Time = $\frac{Volume}{Flux}$
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

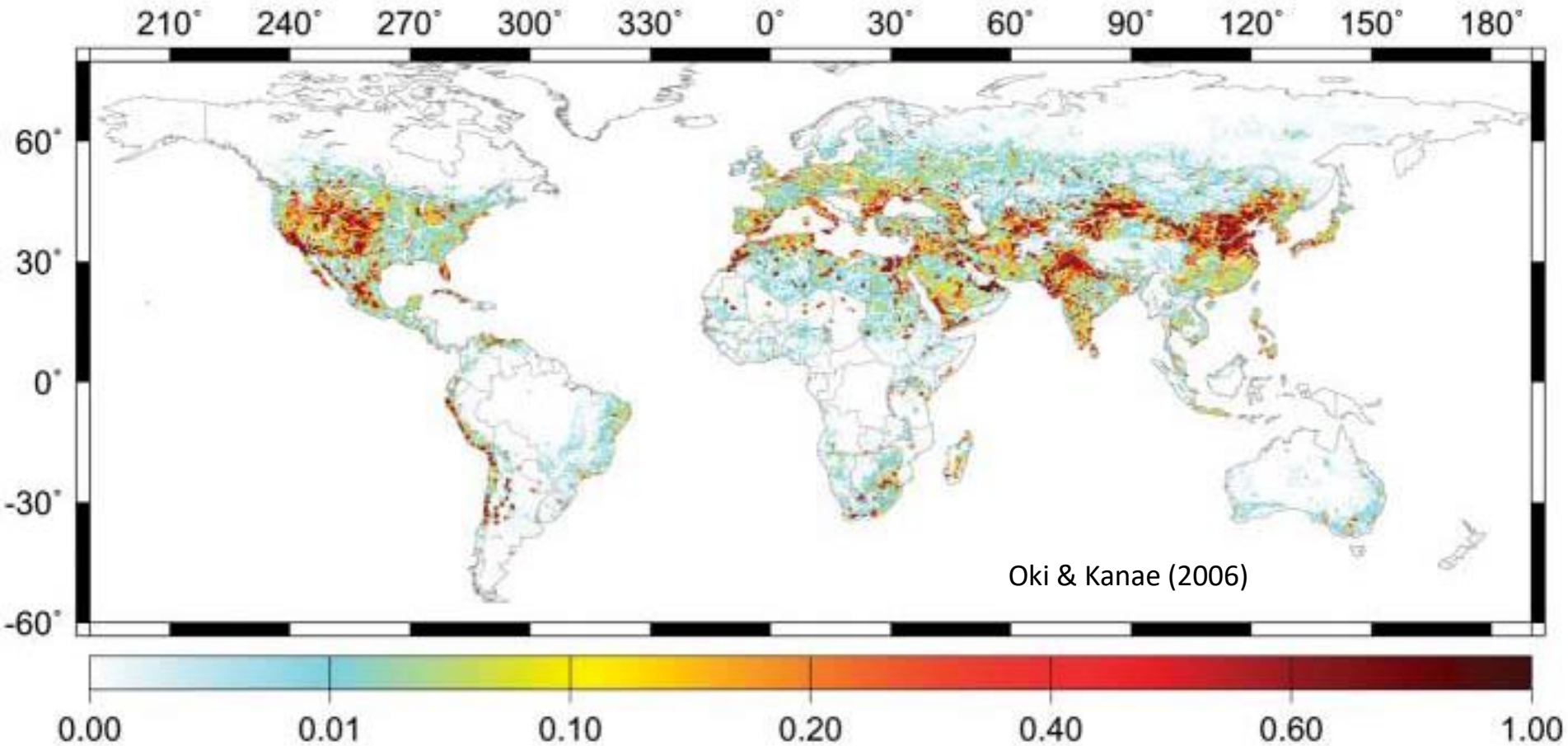
Average Residence Time of Water

(滯留時間)

Short RT =
renewable

c

Water Scarcity Index (R_{ws})



Oki & Kanae (2006)

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

- **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**



6 CLEAN WATER AND SANITATION





Rivers: from uplands to lowlands

10.11.10 Oblique aerial photo © Lands Dept. HKSAR



Colluvial 崩積

Hillslope coupling
Mass movement
Debris flow
initiation & scour

Bedrock 基岩

Debris flow
Flash flood
Sediment
transport

Alluvial 冲積

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

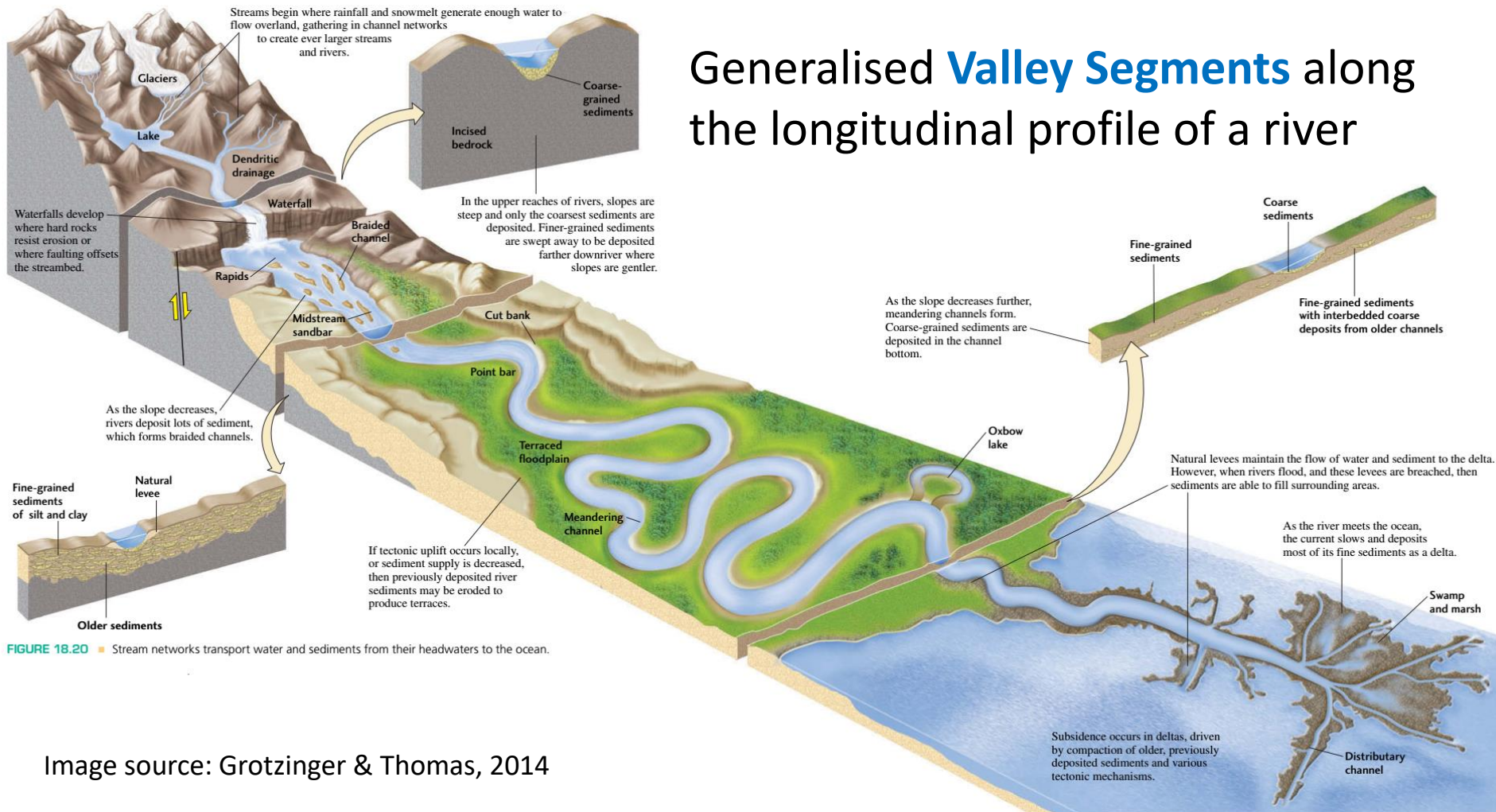


Image source: Grotzinger & Thomas, 2014

Valley Segments

- **Colluvial 崩積**

- Confined valley
- Headwater catchment;
 $A = 1 - 10 \text{ km}^2$
- 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)

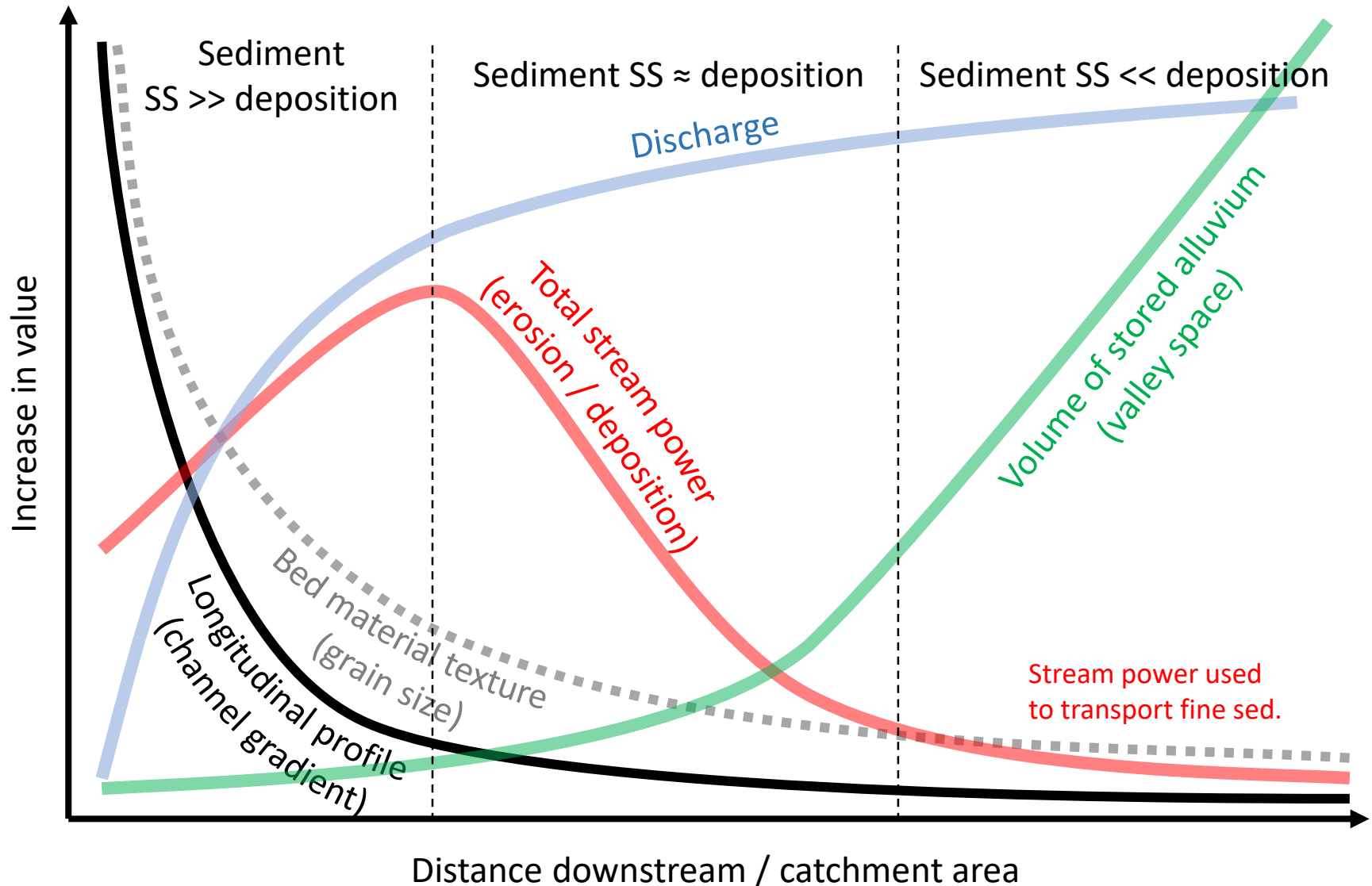




Image source: Geotechnical Engineering Office, HKSAR

往
鉛礦坳

Ephemeral
stream

Landslide
scar

草城石澗

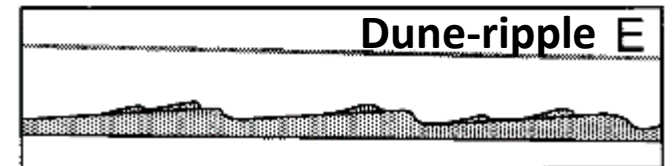
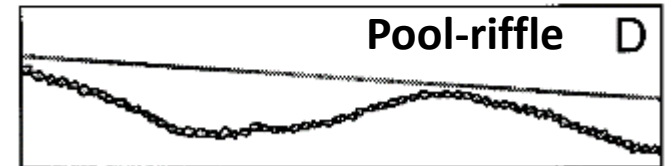
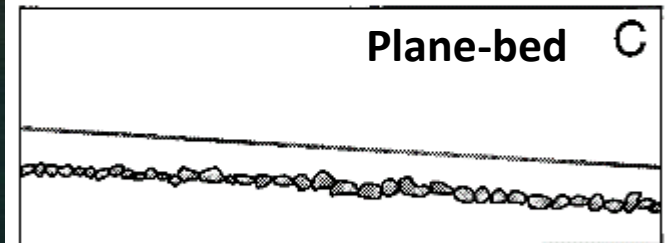
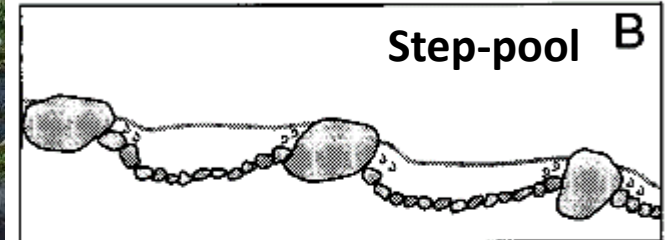
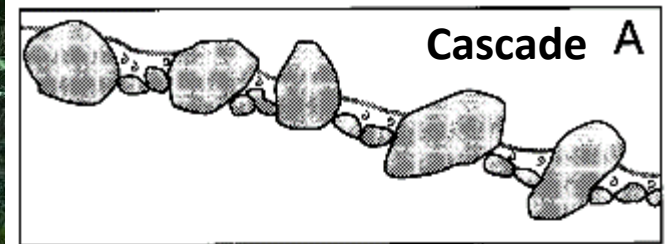
大城石澗

灰橋

水塘

Abandoned
terraces





Montgomery & Buffington (1997)



Gorge dam

31.12.64 Vertical aerial photo © Lands Dept. HKSAR



Flow dir.

Pool-riffle reach

大圍村

車公廟

Mangrove

大圍村

車公廟

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)

Annual benefits
amounted to **€300
billion** to EU alone
(EU, 2013)

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

Direct & indirect
contributions of
ecosystems to

human well-being

Ecosystem Services

- Can be **degraded**
- Even becoming **dis-services**
- Non-market **valuation**

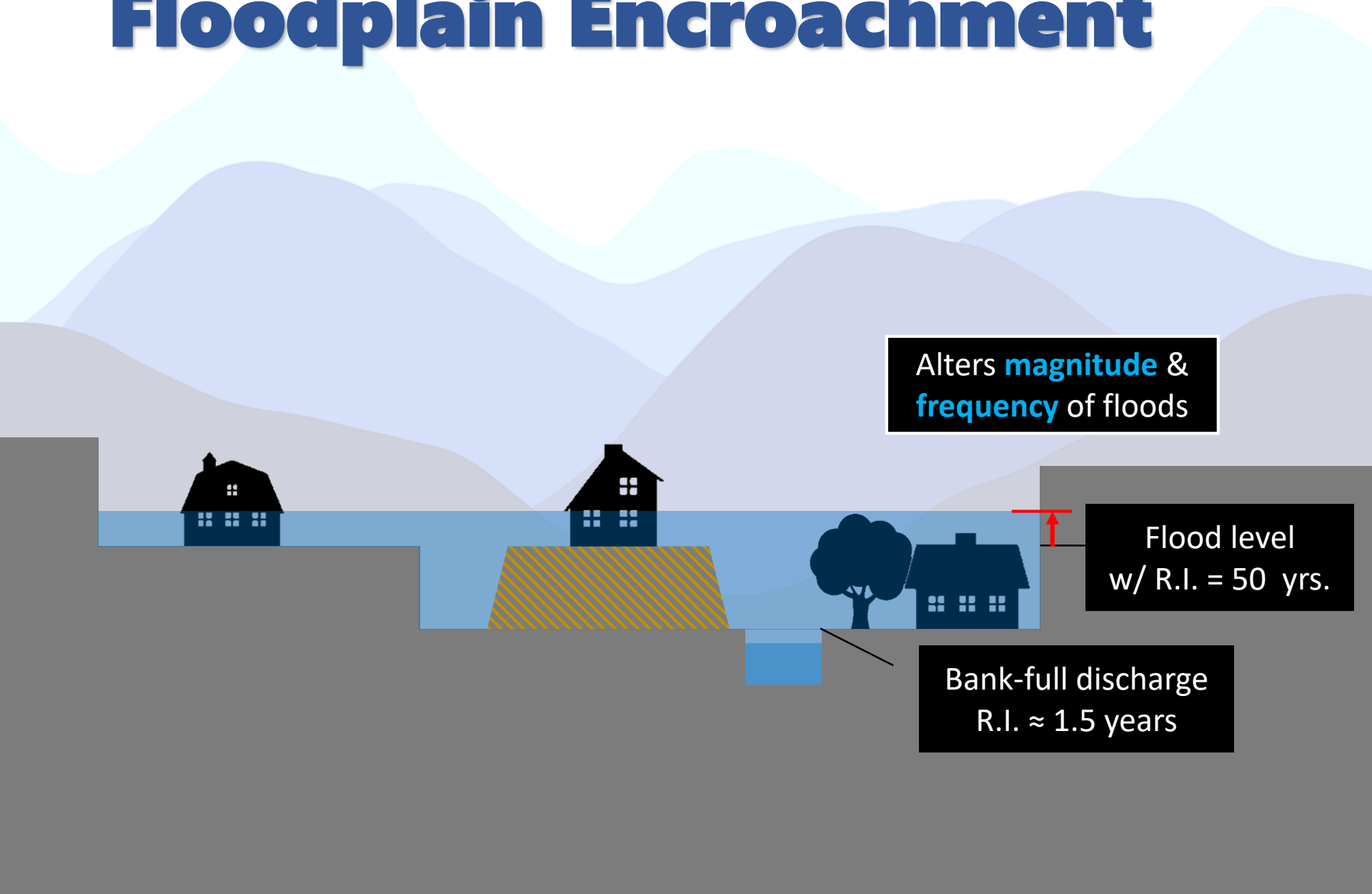
Böck et al. (2018)

Floodplain Encroachment

Alters **magnitude** &
frequency of floods

Flood level
w/ R.I. = 50 yrs.

Bank-full discharge
R.I. $\approx$ 1.5 years



La Jonction in Geneva

R. Rhône

R. Arve

Image source:
Wikipedia



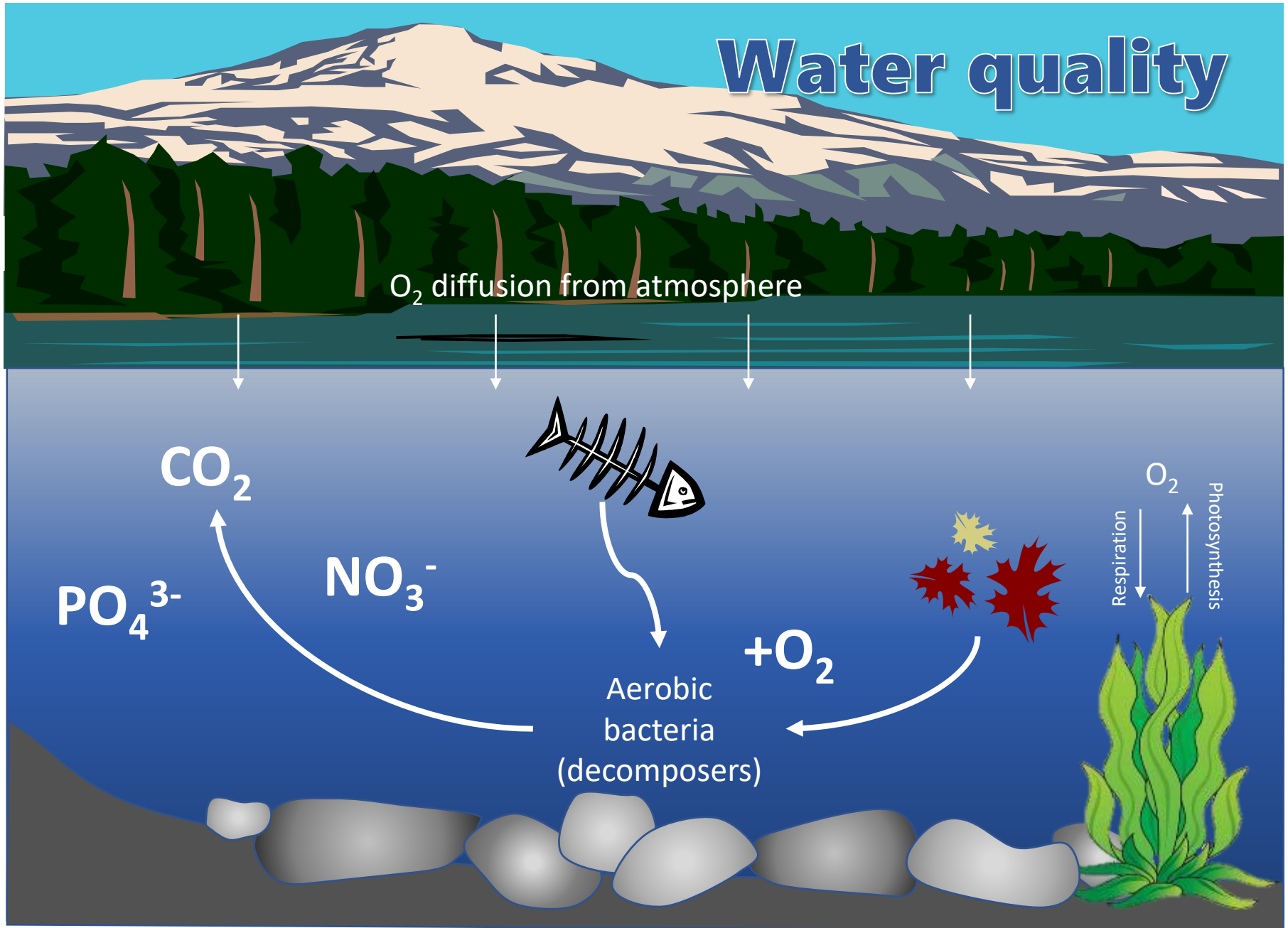
Dam removal at
Elwha River, WA; 2001



New delta formed at
Strait of Juan de Fuca



Water quality





au Tam Mei
imal Waste
osing Plant

Kai Mung Leng

雞公嶺

LAM TSUEN
COUNTRY PARK

Hillslope

1

2

3

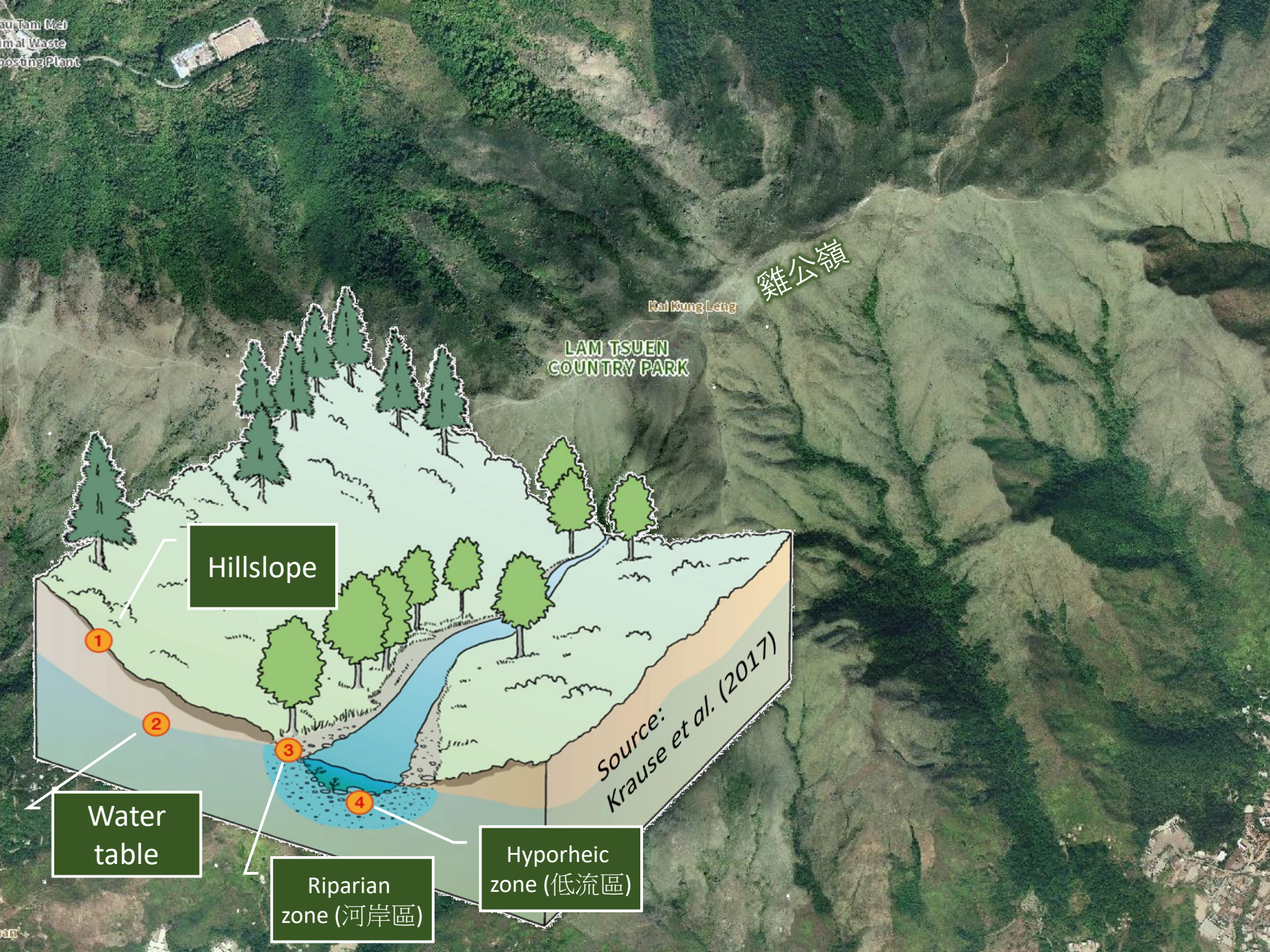
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Water
table

Riparian
zone (河岸區)

Hyporheic
zone (低流區)

Source:
Krause et al. (2017)



K



A satellite image showing the Yangtze River delta region. The river, labeled 'R. Yangtze', flows from the left towards the center, where it meets the Yellow Sea. A large, turbid, yellowish-brown sediment plume extends from the river mouth into the Yellow Sea. The surrounding waters are a darker green/blue. The East China Sea is visible to the south of the Yellow Sea. The land area on the left shows a mix of green vegetation and brown urban/developed areas.

Yellow Sea

R. Yangtze

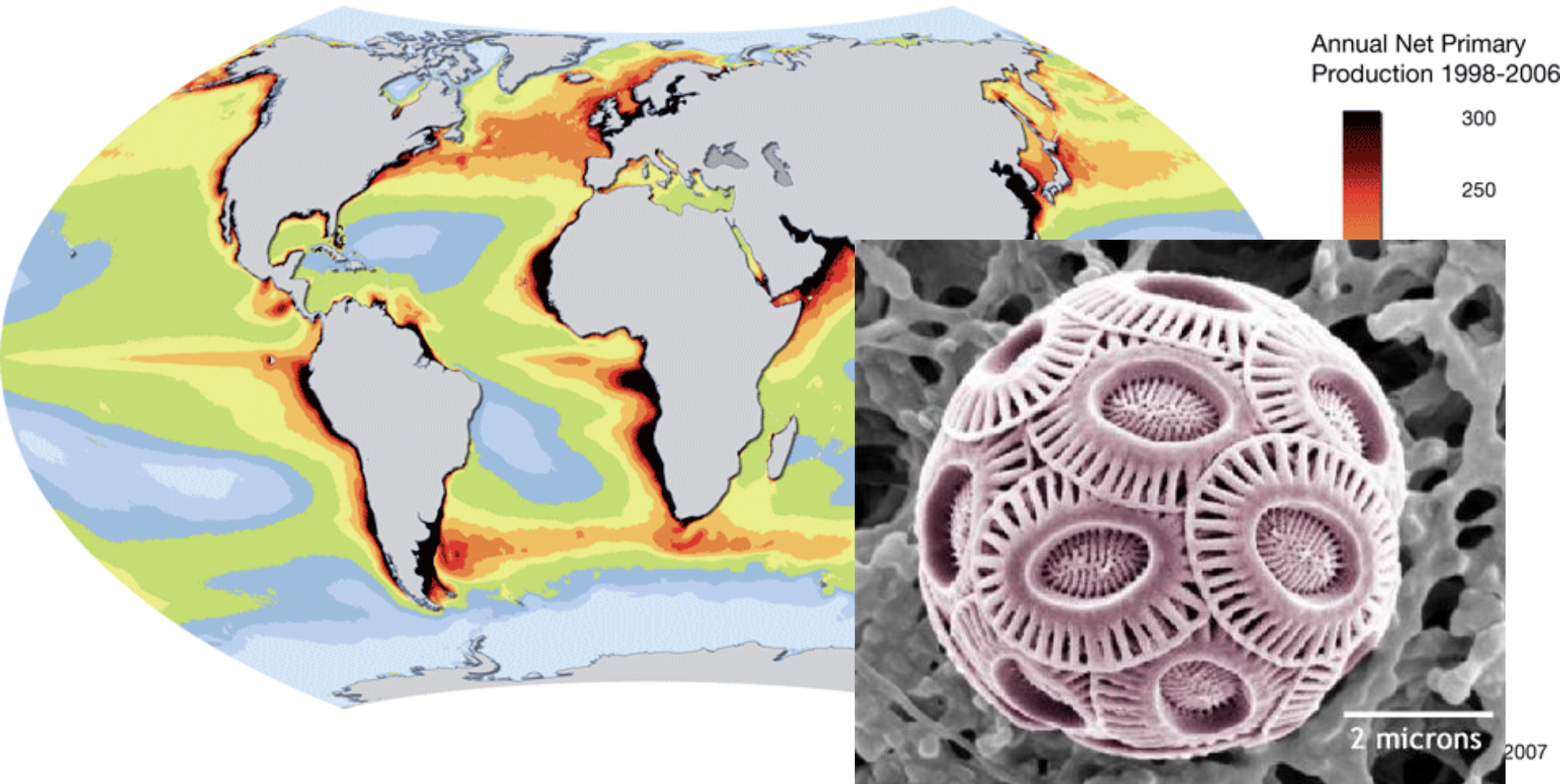
Sediment plume
沉積物羽流

East China Sea

Source: NASA
MODIS Web

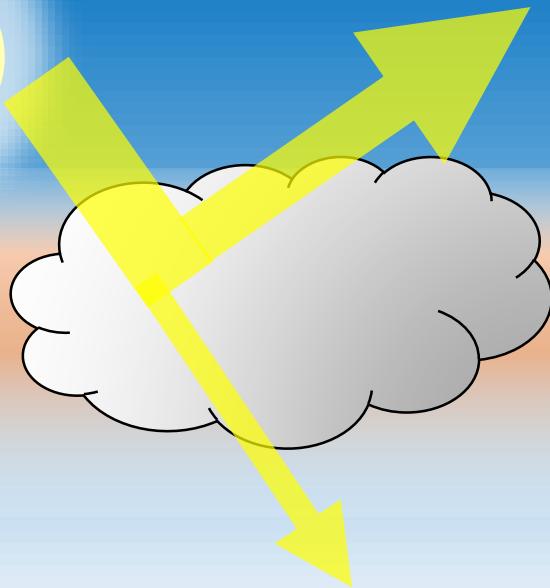
Net Primary Production

淨初級生產量





+ Albedo

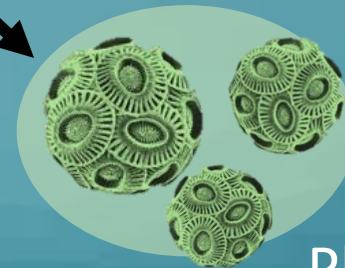


← CCN ←

Sulphate
aerosol

↑
Dimethyl sulfide (DMS)

CO₂



Phytoplankton

Exerts a net cooling
effect & modulates
climate change

↓
Burial of organic carbon

Source: wsd.gov.hk



Provisioning Services



W
Im

Concentration of pollutants:
mg/L, ppm

Average wholesale price of sand



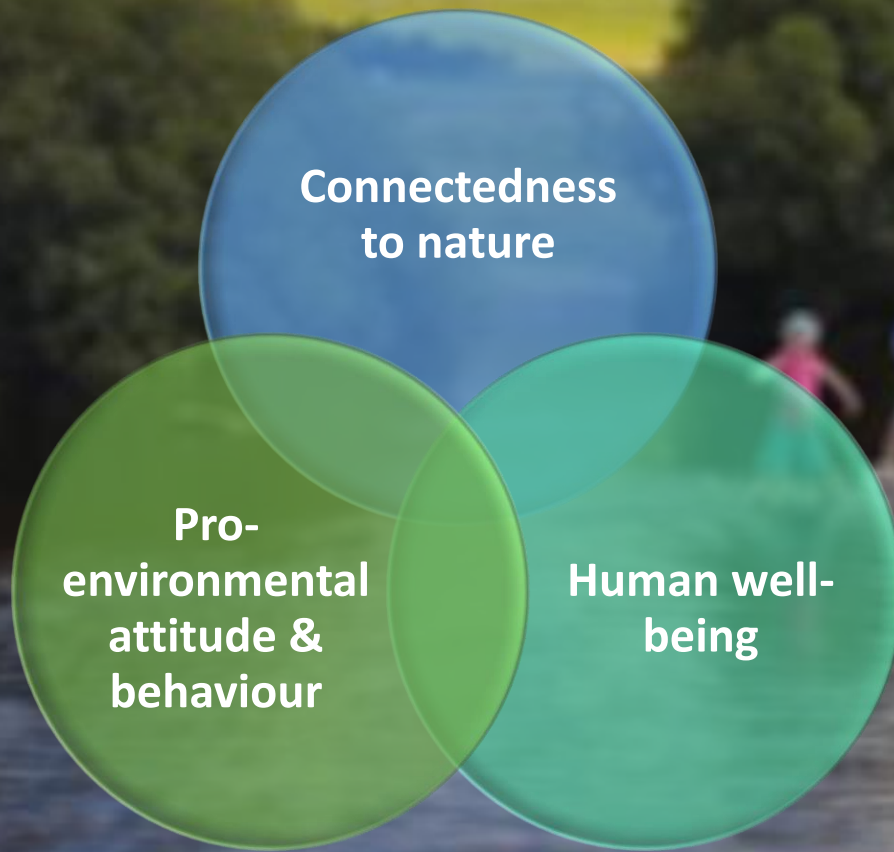
Cultural Services

《風雲：雄霸天下》
劇照 (1998)



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

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 ($\therefore$ 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.

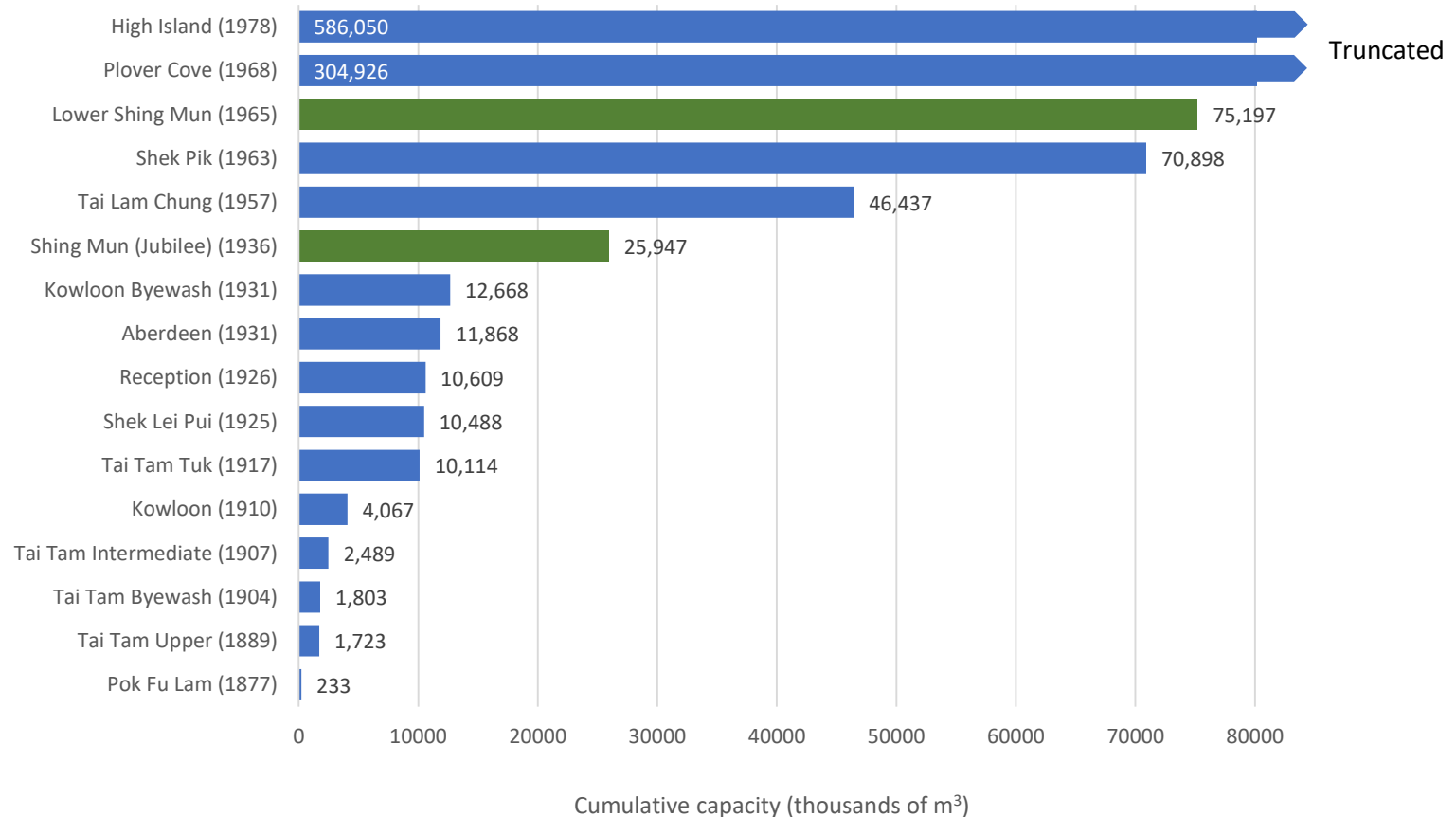




Source: T7-SW-13C
Lands D., HKSAR

This topographic map depicts a hilly area with numerous contour lines indicating elevation changes. A prominent road runs diagonally across the center-left portion of the map. To the right of this road, there are several rectangular structures representing buildings or industrial sites. The terrain is characterized by dense contour lines, particularly in the upper right and lower left sections. Various labels in Chinese characters are scattered throughout the map, identifying specific locations and features. A circular feature, possibly a well or a small pond, is visible in the upper left quadrant.

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/>

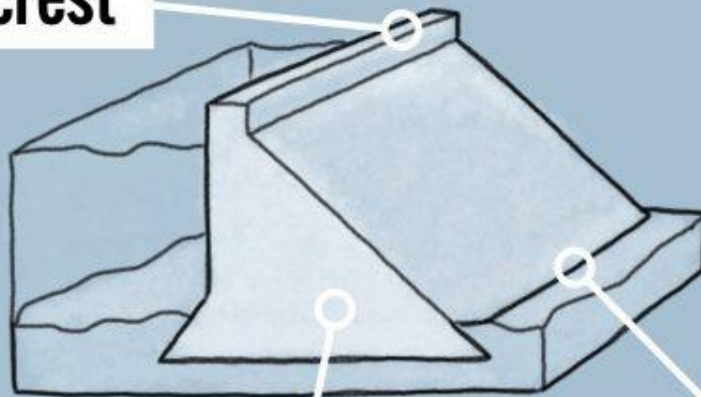


embankment dam



buttress dam

crest



gravity dam

heel

arch dam



dam types



An aerial photograph showing a large concrete dam structure on the left, surrounded by dense green forest. To the right of the dam is a large reservoir. A curved path runs along the top of the dam. In the foreground, a spillway inlet with a gate is visible. The background features a city with many high-rise buildings and mountains under a cloudy sky.

Lower Shing Mun Dam & Tai Wai Nullah

Embankment

Spillway
inlet

Source: Vince C @YouTube



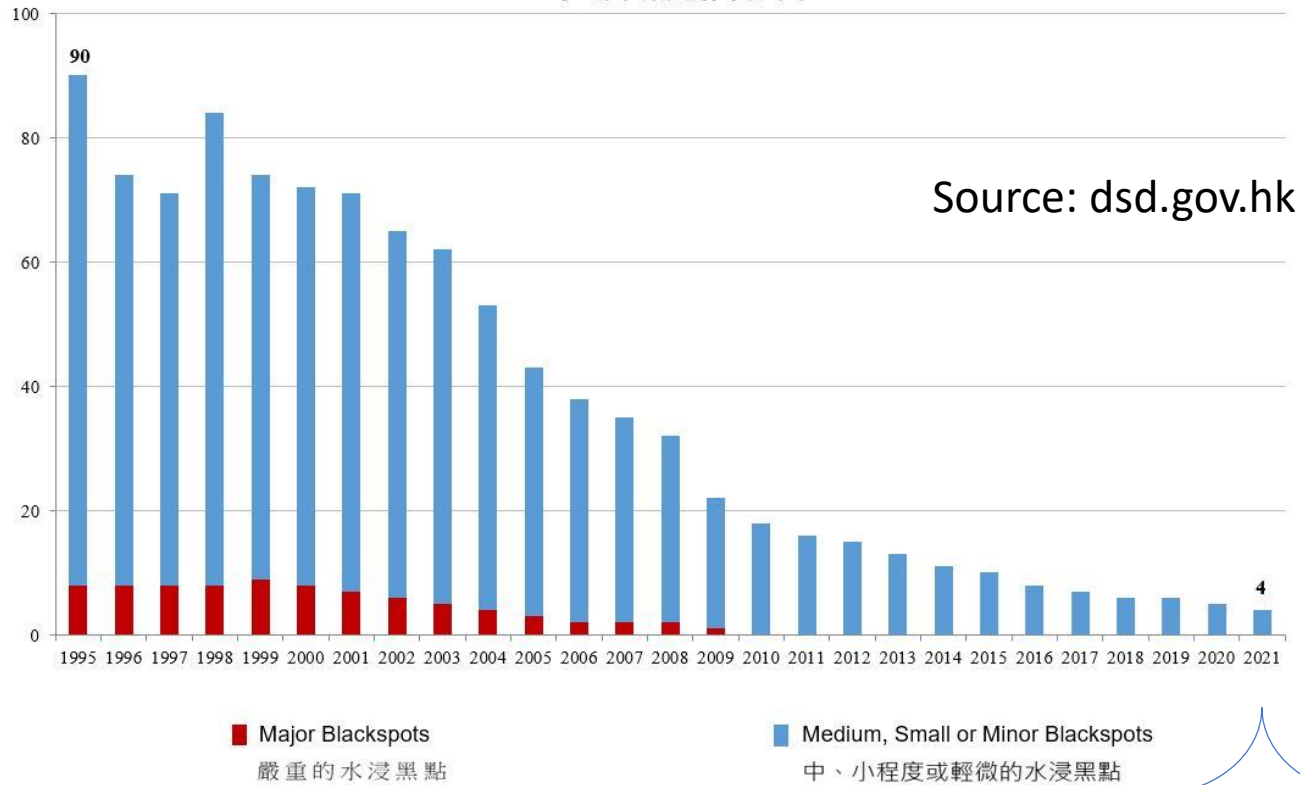
Source: Chung Ho

Google

Image capture: Feb 2019. Images may be subject to copyright. © Pic

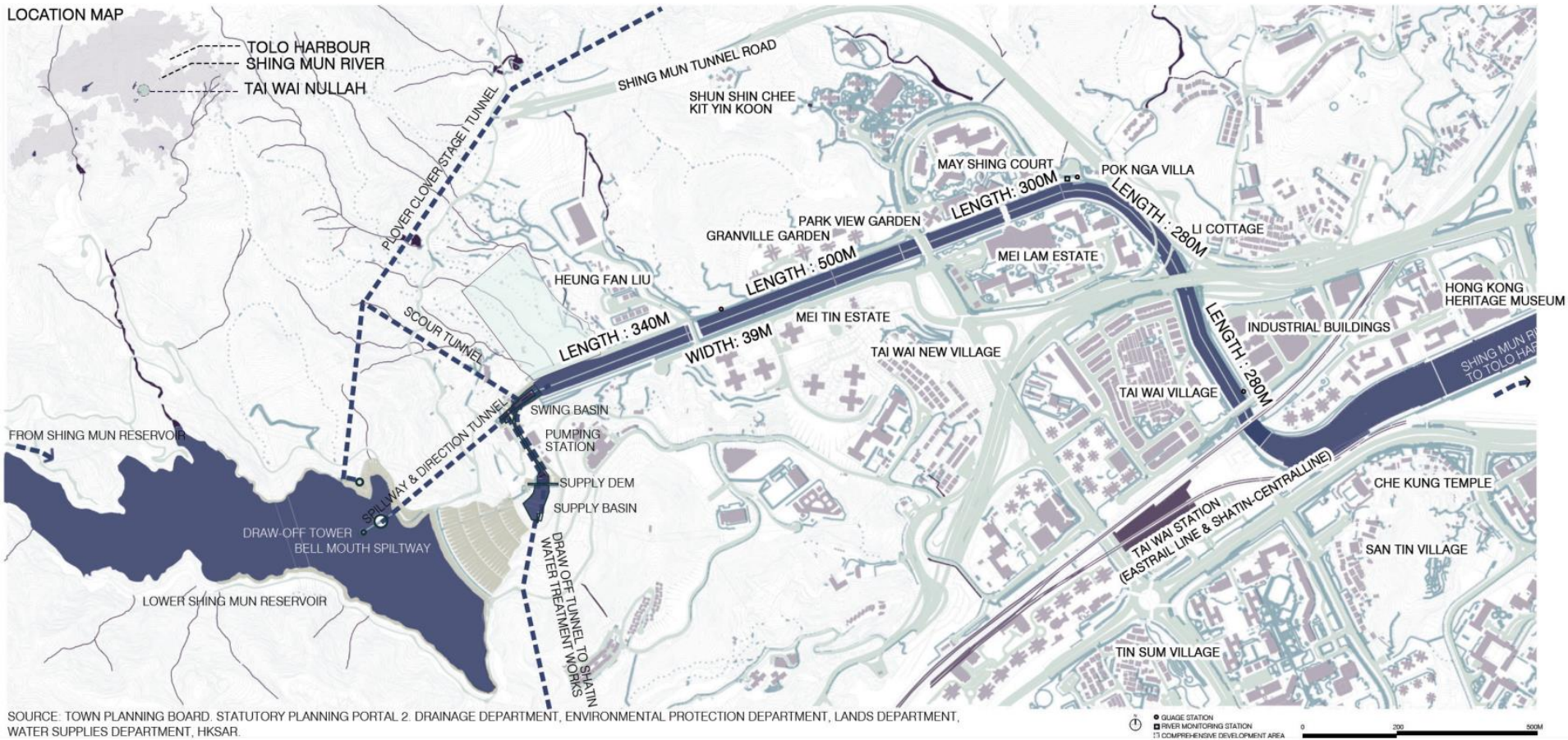
Number of Flooding Blackspots

水浸黑點數目



1. 元朗
 2. 大埔
 3. 油尖旺
 4. 南區
- 新田石湖圍
林村谷盆地
漆咸道南
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	鹵水	>50

Shatin STW

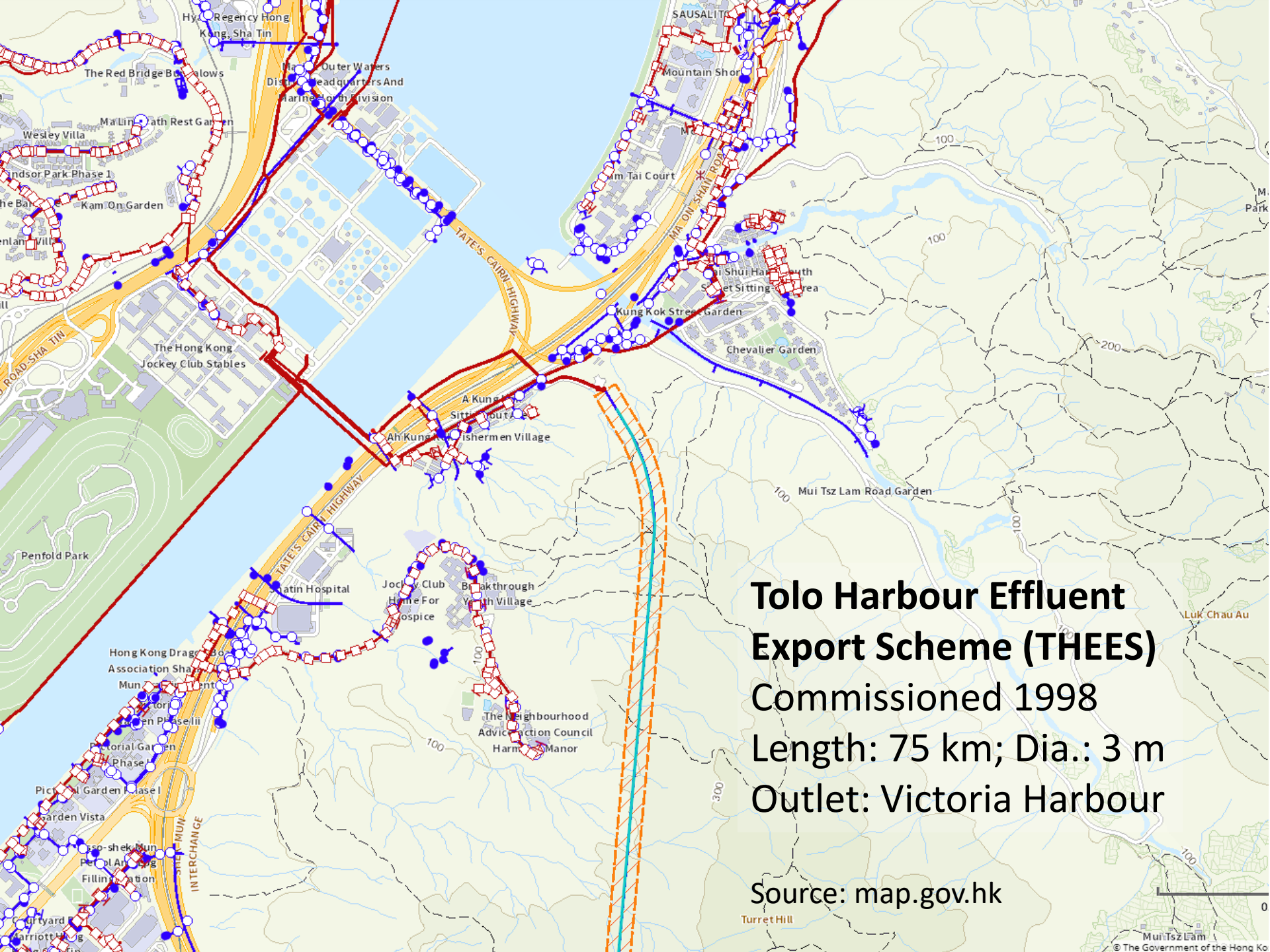
Commissioned in 1982

Area: 28 ha

Cap: 340,000 m³/day



Source: DSD



**Tolo Harbour Effluent
Export Scheme (THEES)**
Commissioned 1998
Length: 75 km; Dia.: 3 m
Outlet: Victoria Harbour

Source: map.gov.hk

香港河溪生態

Ecology in Hong Kong's Rivers

呂德恒
Henry Lui



綠色力量
GREEN POWER









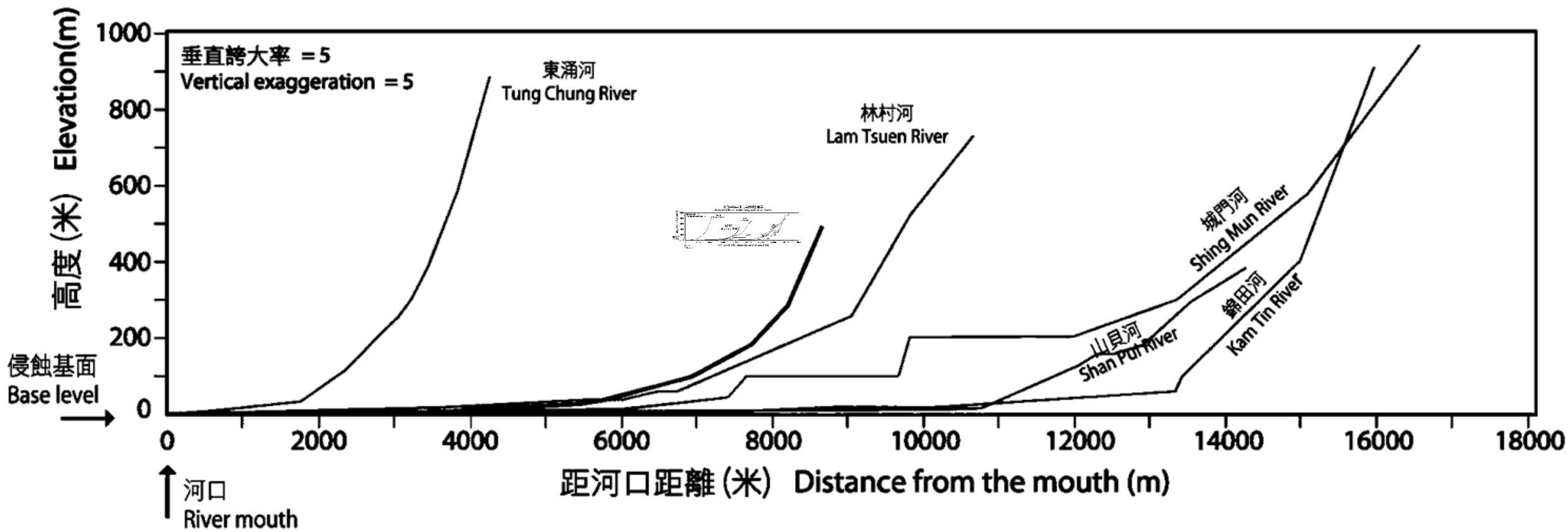




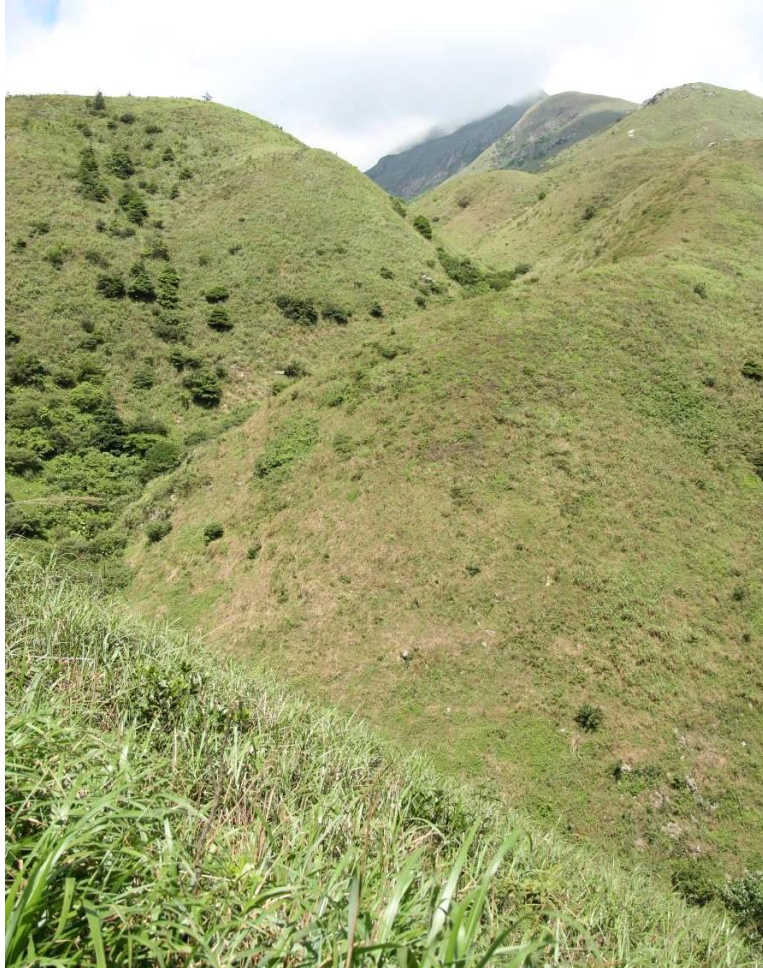




河流縱剖面圖 River Profiles



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.

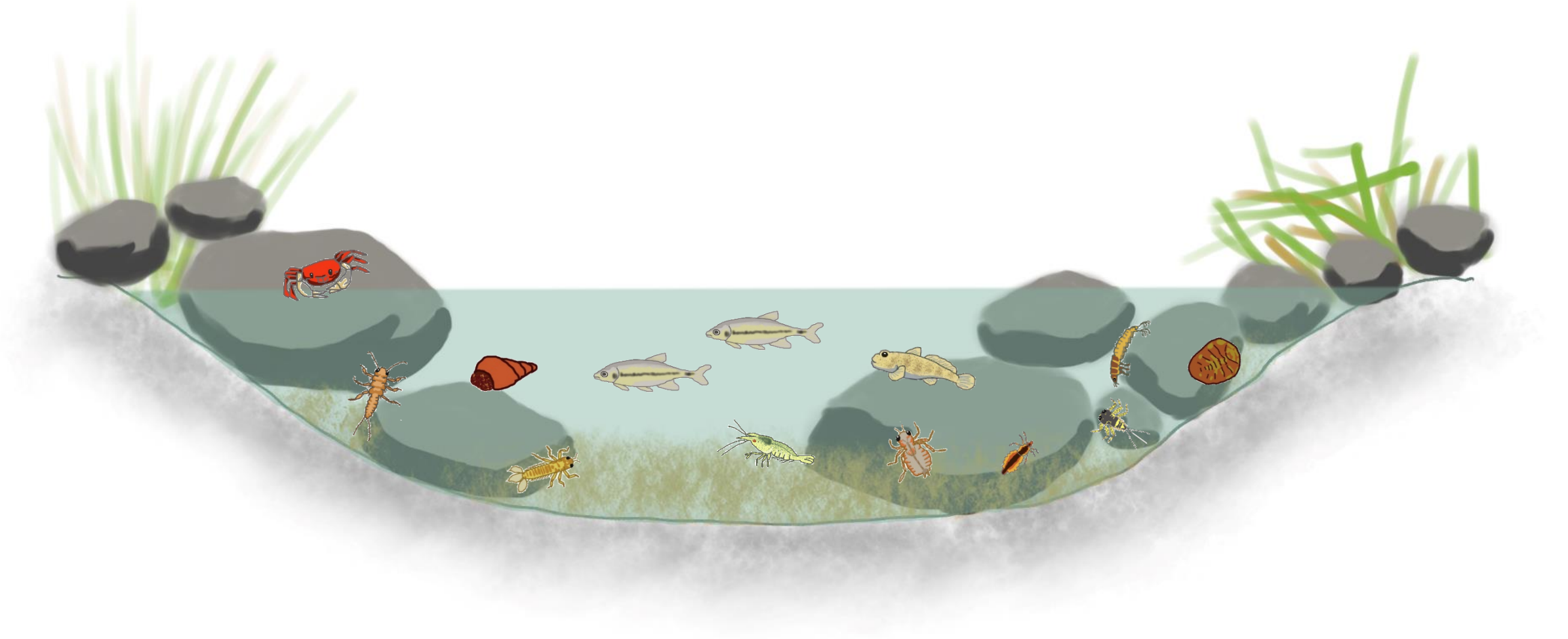


A photograph of a stream flowing through a forest. The water is clear and shallow, flowing over numerous large, moss-covered rocks. The surrounding area is lush with green vegetation, including trees and ferns. The stream is bordered by a dense forest of tall, thin trees. The water is dark and reflective, showing the surrounding greenery. The rocks are of various sizes and shapes, some covered in a thick layer of green moss. The overall scene is peaceful and natural.

水潭
Pool

淺流區
Riffle

微生物境 Micro-habitat



功能性攝食組別 Functional Feeding Groups

(ngit⁶)

- 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

海南溝蜷 Large Stream Snail



扁泥甲 Water Penny

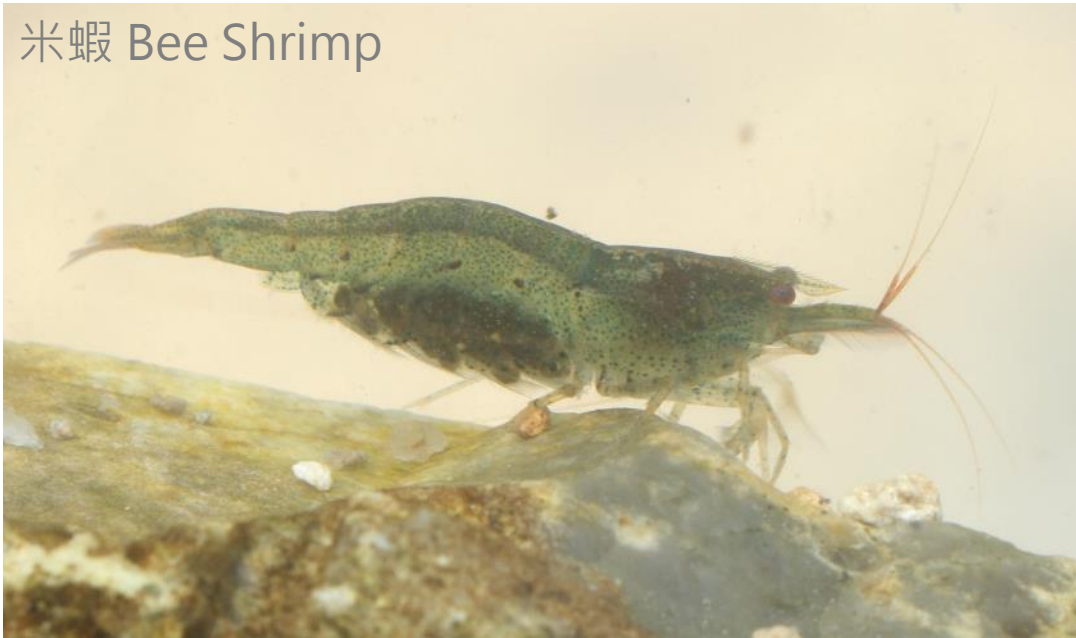


- 撕食者 shredders



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

米蝦 Bee Shrimp



紋石蛾
Caddisfly
Macrostemum sp.



- 捕食者 predators



混合食性 mixed feeding mode

收集者—刮食者 collector-scrapers

扁蜉 Flatheaded Mayfly



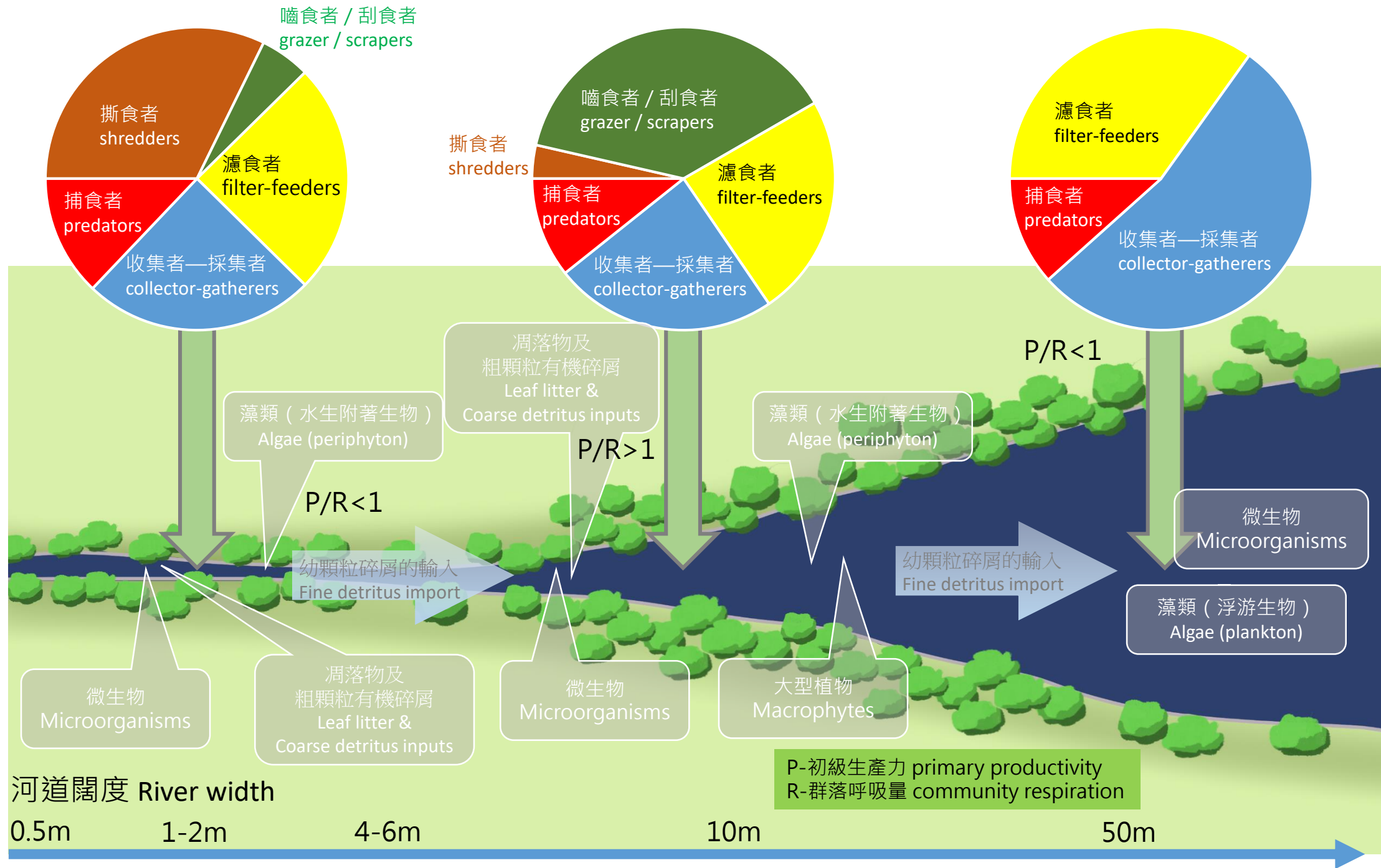
刮食者—捕食者 scraper-predators

擬平鰍 Broken-band Hillstream Loach



河流連續統理論

River Continuum Concept





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.

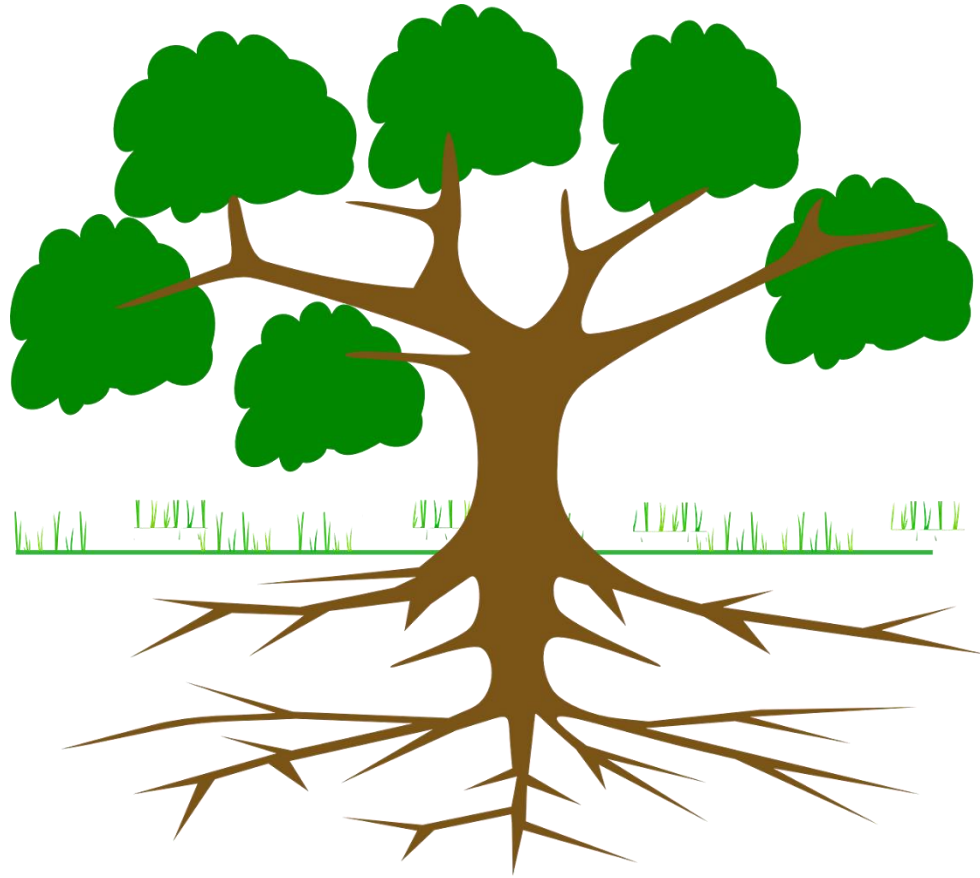
分類Classification	學名Scientific name	中文俗名Chinese common name
蜉蝣目Ephemeroptera（蜉蝣Mayfly）		
細裳蜉科Leptophlebiidae	<i>Choroterpes</i> spp.	寬基蜉
	<i>Habrophlebiodes gilliesii</i>	吉氏柔裳蜉
	<i>Isca purpurea</i>	
蜉蝣科Ephemeridae	<i>Ephemer</i> spp.	蜉蝣
小蜉科Ephemerellidae	<i>Ephemerellina</i> sp.	微蜉
	<i>Serratella albostrata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



落葉
Leaf litter

鞏固泥土
Consolidate
the soil



微生物境
Micro-
habitat

林蔭
Shading







登入

大埔滢自然
護理區

禾
WO S
T

黃竹洋
WONG CHUK
YEUNG

友愛村
YAU OI TSUEN

下城門水塘主壩
Lower Shing Mun
Reservoir Main Dam

香粉寮
HEUNG FAN LIU

白田
PAK TIN

美城苑
May Shing Court

壹號雲頂
Peak One

萬佛寺

Po Fook Hill Cemetery

樂山
MOUNT
PLEASURE

大圍新村
TAI WAI
NEW VILLAGE

TAI WAI

上禾輦
SHEUNG
WO CHE

田寮
TIN LIU

荔枝園
LAI CHI YUEN

沙田
Sha Tin

新城市廣場

名城
FESTIVAL CITY

大圍村

文禮閣
Man Lai Court

沙田車公廟

車公廟
Che Kung Temple

沙田公園

Shing Mun River

索石商場

新翠商場
Sun Chui
Google g Centre

雲疊花園商場
Carado Garden
Shopping Arcade

顯徑商場
Hin Keng
Shopping Centre

田心警署

隆亨邨



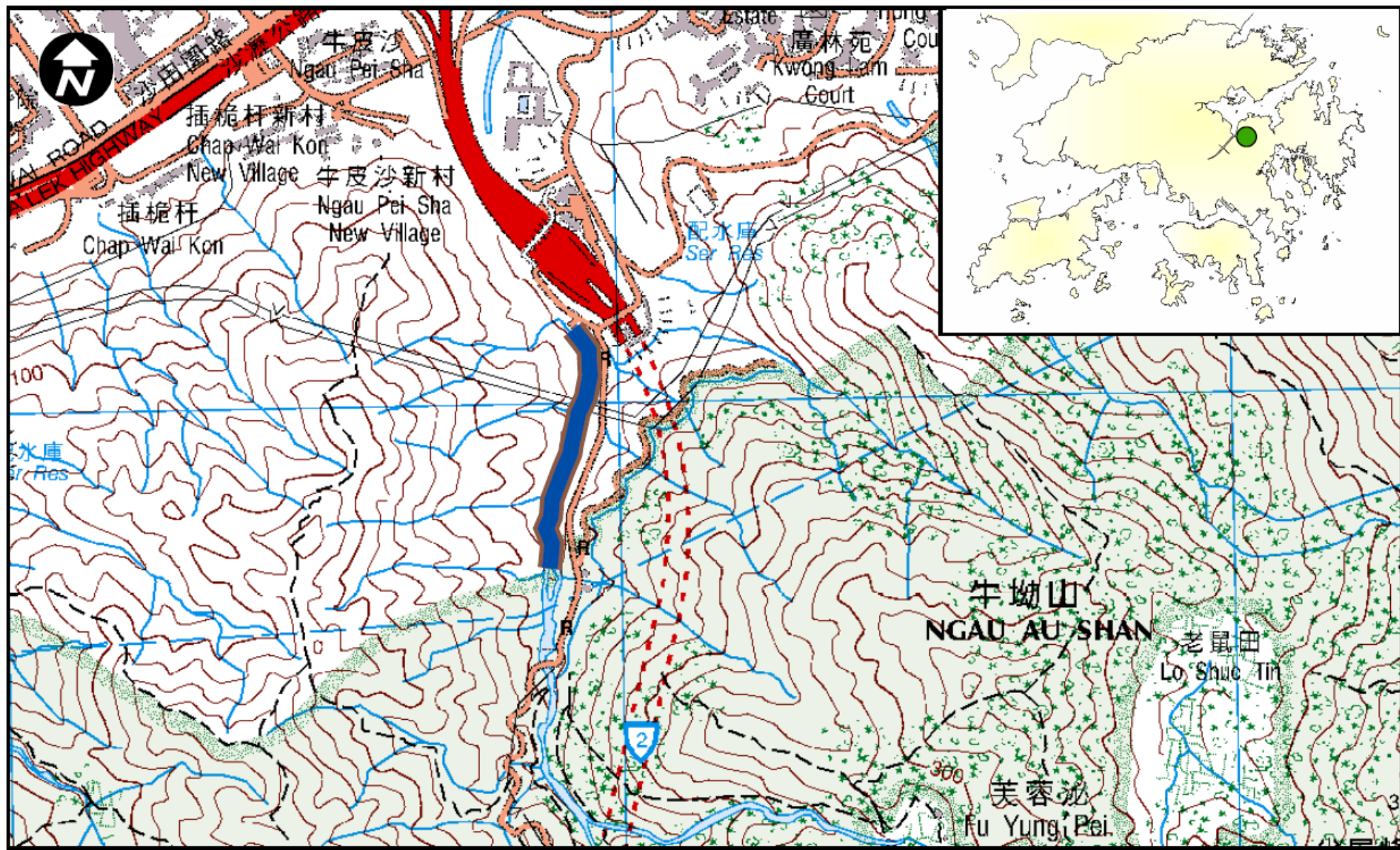




馬麗口坑

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



石蠅 Stonefly



石蛾 Caddisfly



仰蝽 Backswimmer



黽蟾 Water Skater





扁泥甲

Water

Penny

魚 Fish



兩棲類 (蛙及瘰螈)
Amphibian (Frog and Newt)



鳥類 Bird





水鳥 Waterbirds



© Henry Lui



招潮蟹 Fiddler Crab



獾 Mongoose

© Henry Lui







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



Workshop: 25 June 2021
Field trip: 26 June 2021



Mr Anthony Yeung & Ms Alice Cho
Hong Kong Geographical Association



**(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

Shing Mun River



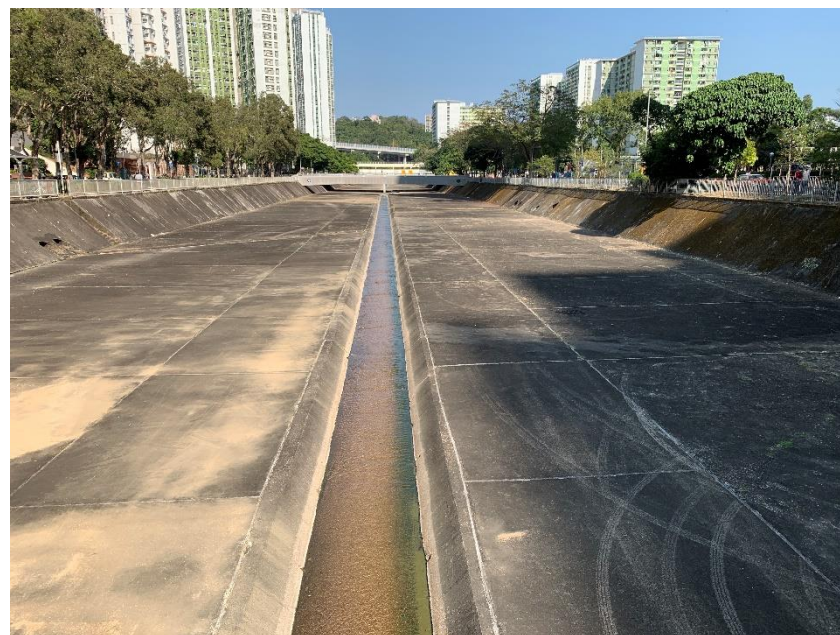
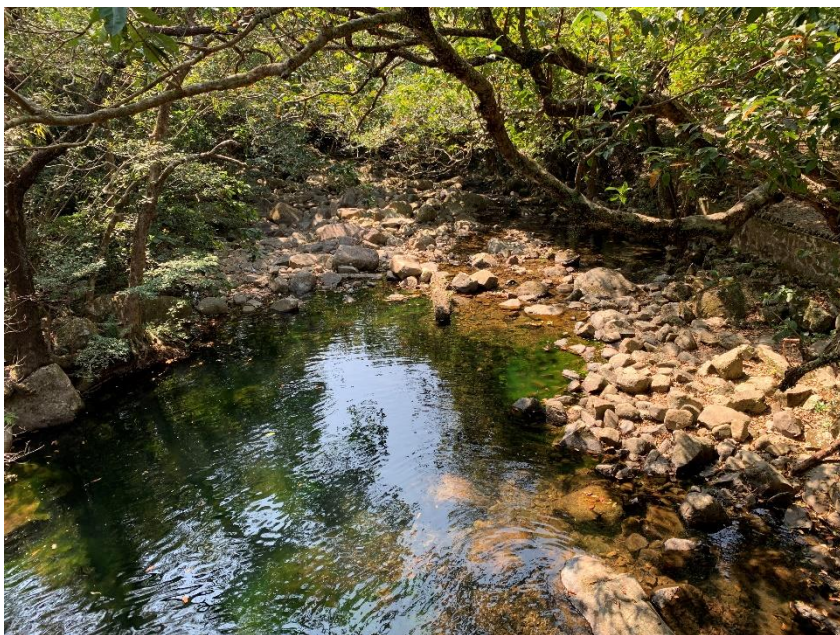
Ms. Alice Cho
Hong Kong Geographical Association



Enquiry Question

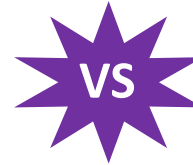
Dissolved oxygen is regarded as an important indicator of water quality. Evaluate the validity of the following statement:

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



1 Objectives of river management strategies

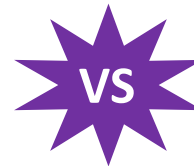
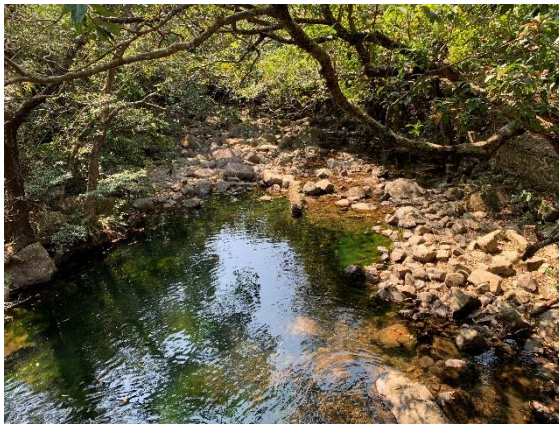
Tai Wai Nullah: Flood control
(since 1970)



Ecological enhancement
(revitalization plan 2024-29)

2 River characteristics

Stream flows into Upper Shing
Mun River (natural stream)



Tai Wai Nullah
(channelised watercourse)



3 Water quality related to hard engineering strategies

Dissolved oxygen level

Field Study Sites



http://bit.ly/Shing_Mun





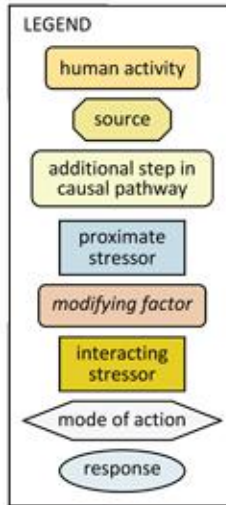
Tai Shing Stream
大城石澗





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



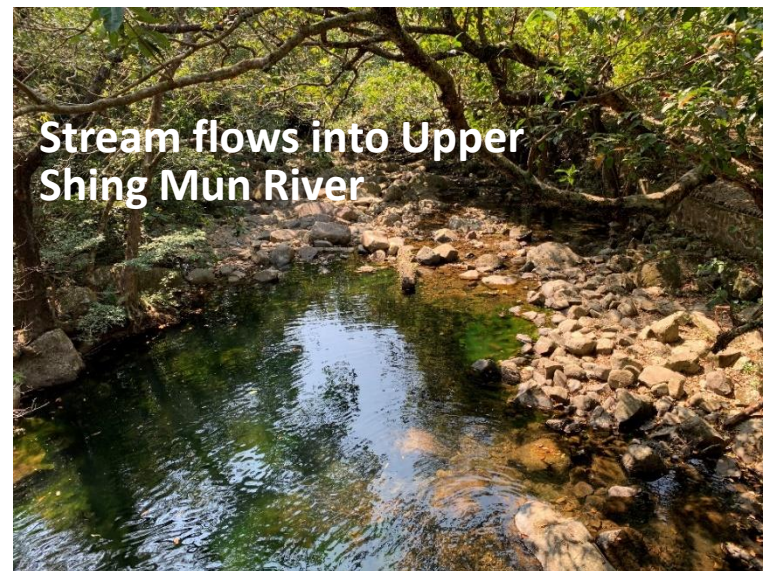


➤ By Observation

Channel Appearance and the Surrounding Environment

pp. 27, 30

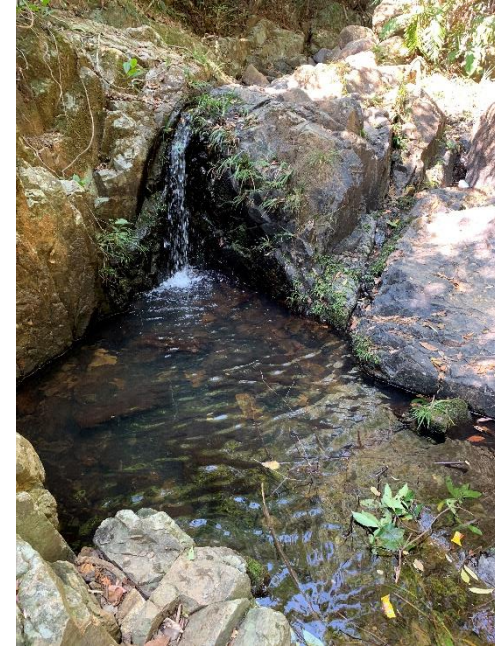
- Channel width
- Shape of river bank
- River bed material
- Water depth
- Type of stream flow
- Channel gradient
- Surrounding environment



➤ 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



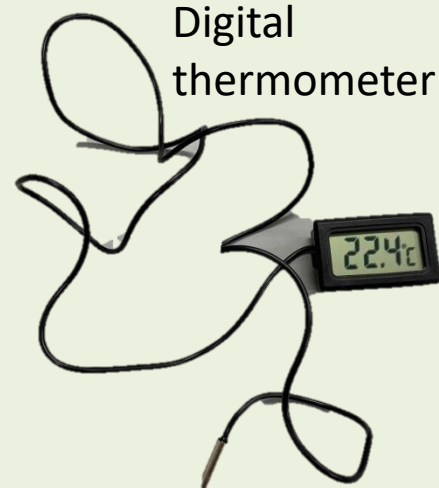
Dissolved oxygen meter



Salinity meter



Conductivity meter



Digital thermometer



Colorimetric



Chemical oxygen demand (COD) rapid test kit



Water monitoring kit



Chemical Oxygen Demand (COD) test



☐ Choose appropriate instruments (pros & cons):

- electronic measuring instruments  rapid test kits (colorimetric)

☐ Precautions when operating the instruments

☐ Choose the right timing of data collection:

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

Feb 2021

'Revitalization of Tai Wai Nullah' project announced in July 2019

Perspectives of the revitalization project from Drainage Service Department

Re-surfacing and greening of
nullah bed and embankment

Modification of
low flow channel

Provision of ecological
enhancement features

Viewing decks

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_Practice_Notes/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



Mr. Anthony Yeung
Hong Kong Geographical Association



“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.

城門水塘內的歷史建築物及構築物

Historic Buildings and Structures at Shing Mun Reservoir



(1) 城門水塘紀念碑 (法定古蹟)
Memorial Stone of Shing Mun Reservoir

城門水塘紀念碑於二〇〇九年九月十八日列為古蹟，受《古物及古蹟條例》保護。

城門水塘於一九二三年開始動工，歷時十四年方告完成。城門水塘建造工程規模龐大，當時水塘除了為九龍半島供水，滿足九龍居民的食水需要外，也透過跨海水管把食水輸往人口密集的香港島。當時沙嘴港為所面對的食水需求壓力，城門水塘是戰前最大儲水量的水塘，同時為九龍和港島供水。

城門水塘紀念碑和大潭篤水塘紀念碑，是本港僅有兩處為紀念水塘的興建而豎立的紀念碑，以紀念二次大戰前分別位於新界及港島的兩大水塘的落成。

(1) Memorial Stone of Shing Mun Reservoir (Declared Monument)
The memorial stone of Shing Mun Reservoir was declared a monument on 18 September 2009 and is protected under the Antiquities and Monuments Ordinance.

Commenced in 1923, the construction of Shing Mun Reservoir took fourteen years to complete. The massive scale of the project meant that water could be supplied to cater the needs of the residents of Kowloon Peninsula, but also to relieve pressure on demand on densely populated Hong Kong Island via the cross-harbour mains, and this made it the largest reservoir of the pre-war period to provide water for both sides of the harbor.

The memorial stone at Shing Mun Reservoir and Tai Tam Tuk Reservoir are the only two memorial stones that were erected to mark the completion of the two largest reservoirs in the New Territories and on Hong Kong Island respectively built before the Second World War.



你在此
You are here



(2) 主壩
Gorge Dam

現時城門水塘內的主壩、水掣塔及鐘形溢流口已升為一級歷史建築。鐵橋亦已升為二級歷史建築。

(2) 主壩
位於水塘南端的主壩，在建造時已採用各種先進技術，主壩由鋼筋混凝土建造的截水牆、推力牆、消浪斜坡和位置下游的堆石組底，在主壩頂部設有行人通道，兩旁的護欄由磚石砌成。

(3) 鐵橋
鐵橋

現時主壩東北端的鐵橋，建築起主壩頂部的行人通道和水塘內的水掣塔，鐵橋為拱橋，相鄰以交叉支撐連接，橋面鋪設方格狀鐵板。

(4) 水掣塔
八角形的水掣塔由石塊砌築而成，平頂上設裝飾性的欄杆，大圓窗分佈於小的玻璃方格，建築物的外觀令人聯想起歐洲的堡壘。

(5) 鐘形溢流口
鐘形溢流口為圓形的磚石構築物，以石塊建造而成，它獨特的設計更取代了其他水塘的溢流口的設計，此溢流口由Geoffrey Binnie於一九三五年設計，曾一度獲得英國土木工程師學會頒發的 Telford Premium Award。

The Gorge Dam, Valve Tower and Bellmouth Overflow at Shing Mun Reservoir are accorded with Grade 1 status. The Steel Bridge is accorded with Grade 2 status.

(2) Gorge Dam
The main dam of the reservoir is called the Gorge Dam situated at the southern end of the reservoir. It incorporates several technological advances which were not used in previous dams. The dam consists of reinforced concrete diaphragm wall, a concrete thrust block, and abutment and wedge and rock fill on the downstream side. A walkway runs along the crest of the dam with solid masonry parapet walls on each side.

(3) Steel Bridge
On the upstream face of the dam near the northeast end a Steel Bridge spans across the water to the Valve Tower. The bridge is a sawtooth girder bridge with sides formed of segmental top booms and horizontal bottom booms connected by cross-braced lattices. The decking is made up of chequer plate steel sheets.

(4) Valve Tower
The Valve Tower is an Octagonal masonry tower with an ornamental parapet to the flat roof and steel framed windows divided into small glazing squares. The architectural style is reminiscent of castle towers in Europe.

(5) Bellmouth Overflow
Bellmouth Overflow is a circular masonry structure in the reservoir surmounted by a masonry footbridge connecting it to the shore. This unusual feature takes the place of the overspill weirs seen at other reservoirs. The overflow bellmouth was designed in 1935 by Geoffrey Binnie and received the Telford Premium Award from the Institution of Civil Engineers in the UK.



(4) 水掣塔
Valve Tower



(5) 鐘形溢流口
Bellmouth Overflow

水務署
Water Supplies

“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

Tai Shing Stream
大城石澗

大廈、設施、地址等



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



Pineapple Dam
菠蘿壩

Upper Shing Mun Res.
上城門水塘

Heung Fan Liu
香粉寮

Man Lai Court
文禮閣

Main Dam
上城門水塘主壩

Lower Shing Mun Reservoir
下城門水塘

Tai Wai Nullah
大圍明渠

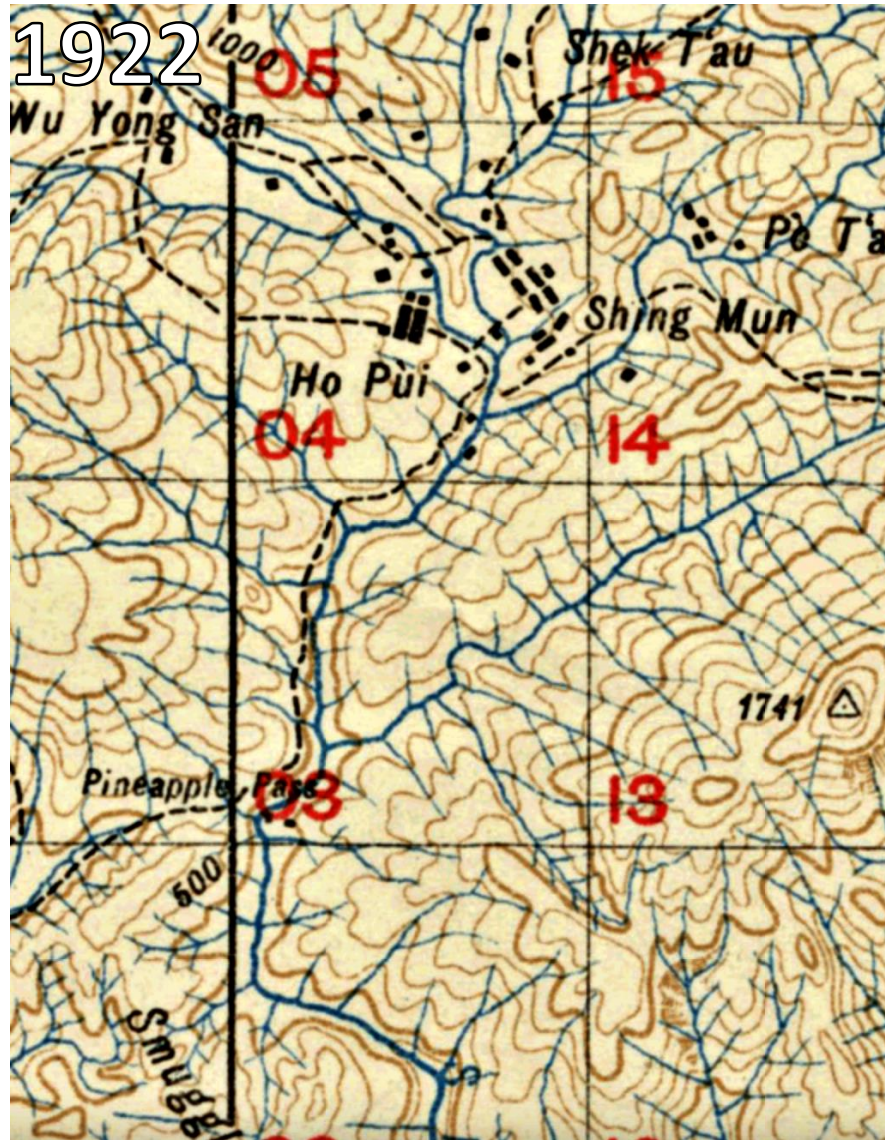
Main Dam
下城門水塘主壩

Tai Wai Station
大圍站

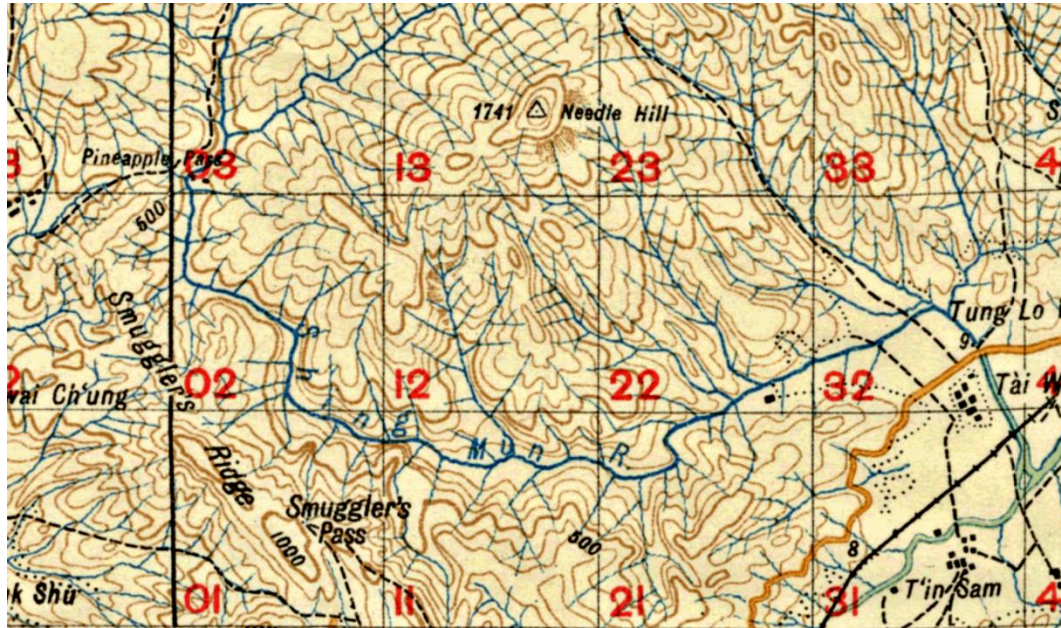
Che Kung Temple
車公廟

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Upper Shing Mun Reservoir

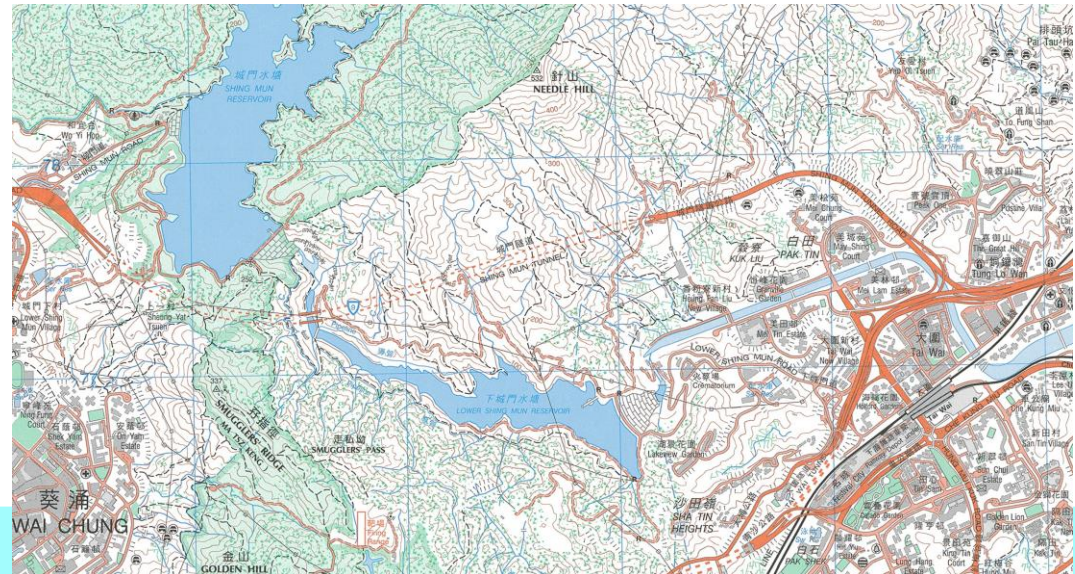


Lower Shing Mun Reservoir



1922

now



Fieldwork Skills



Map & compass work
Map orientation

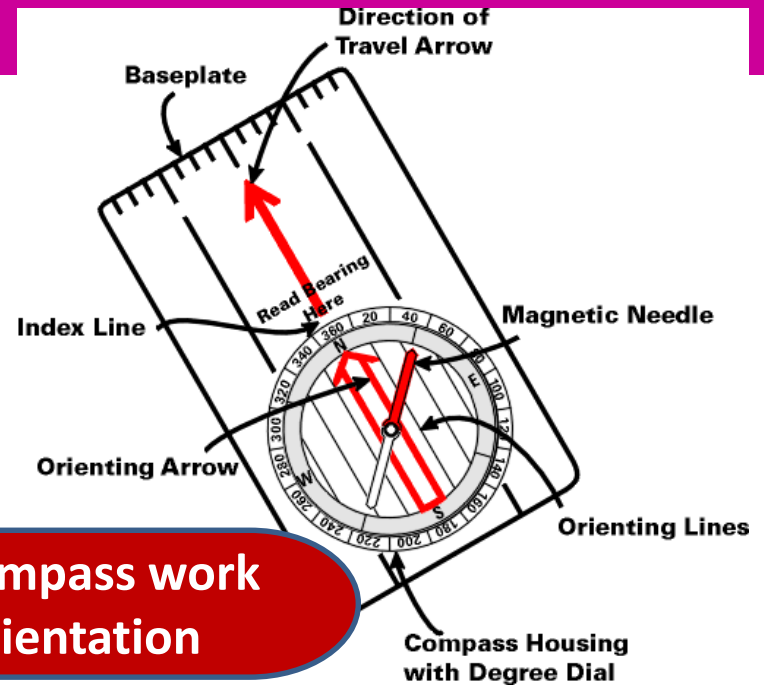
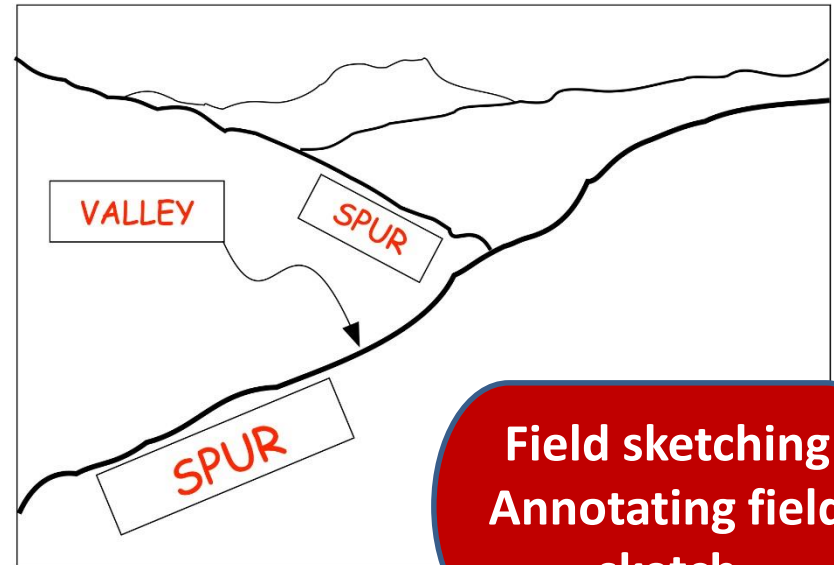


Photo-taking



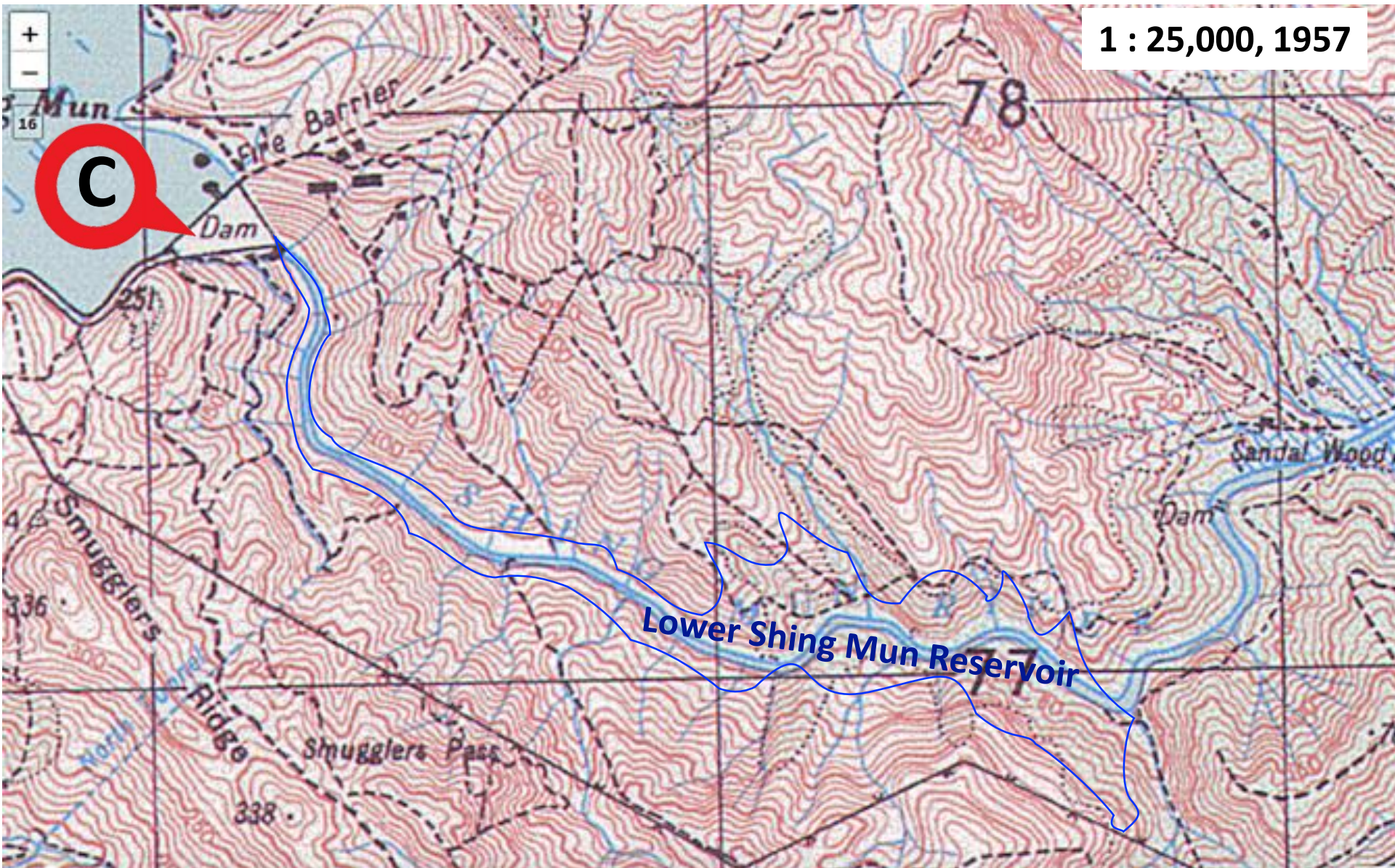
Field sketching
Annotating field sketch

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)

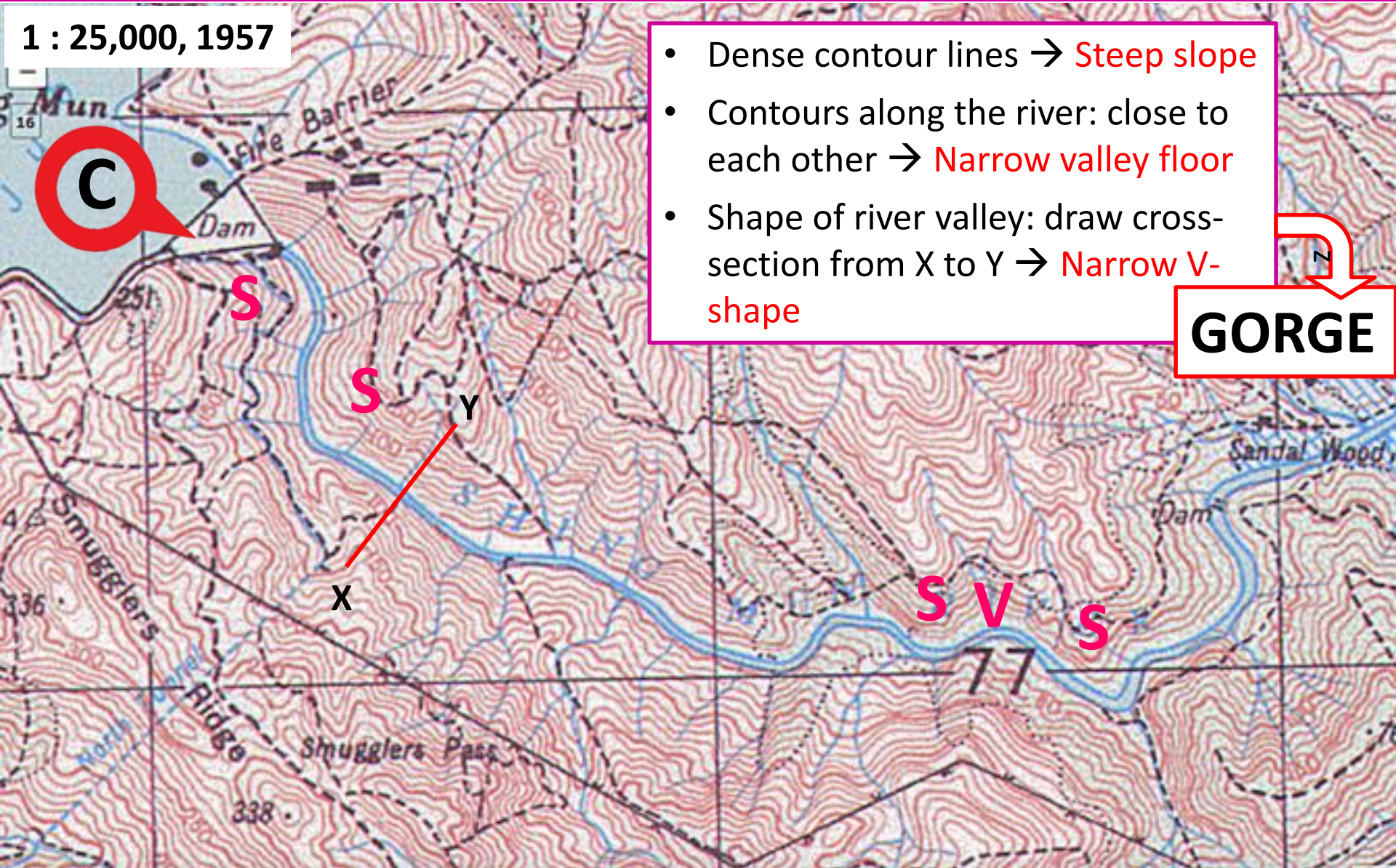


Secondary data – before the construction of lower Shing Mun Reservoir



Secondary data – before the construction of lower Shing Mun Reservoir

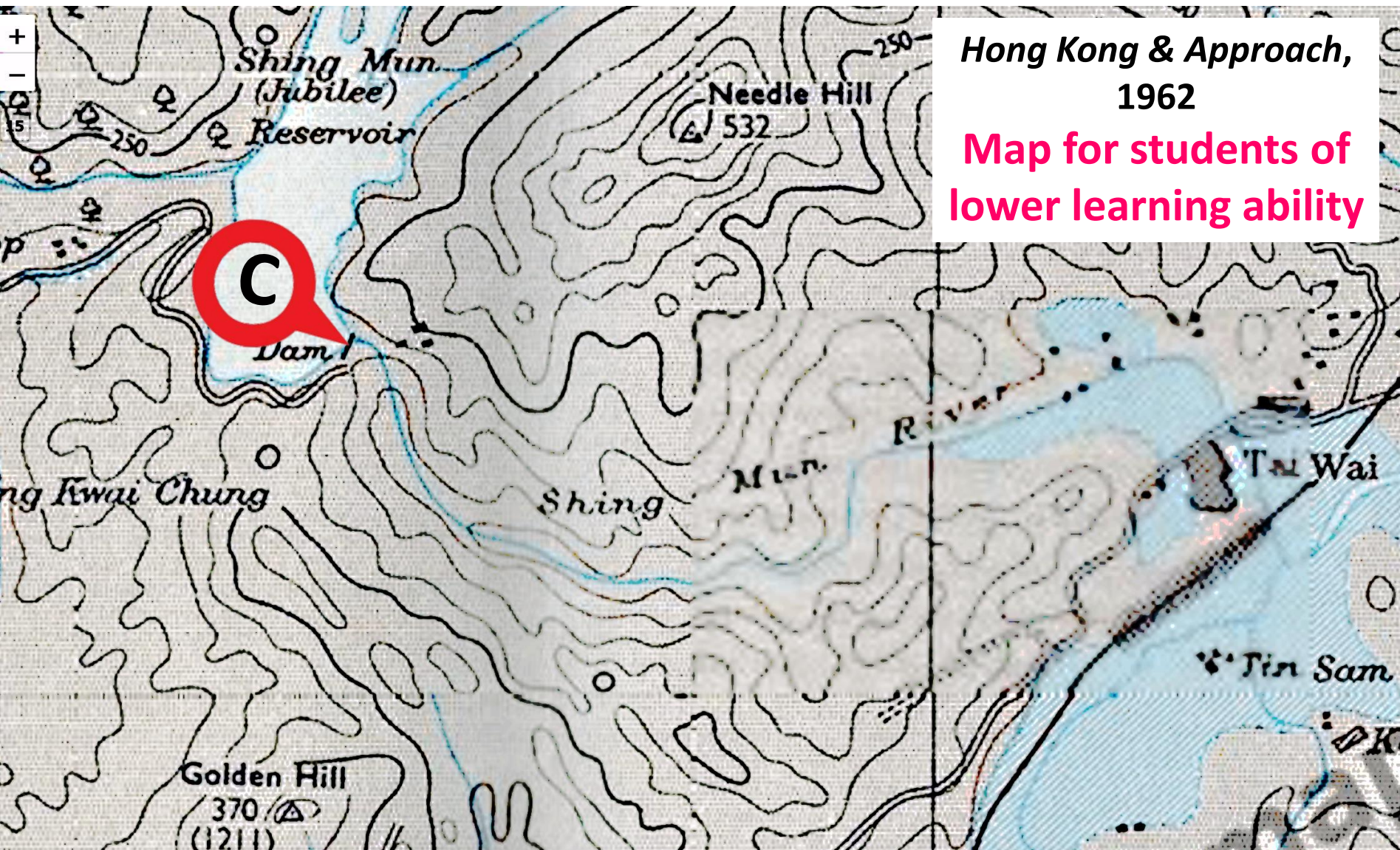
1 : 25,000, 1957



- 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**

GORGE

Secondary data – before the construction of lower Shing Mun Reservoir



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

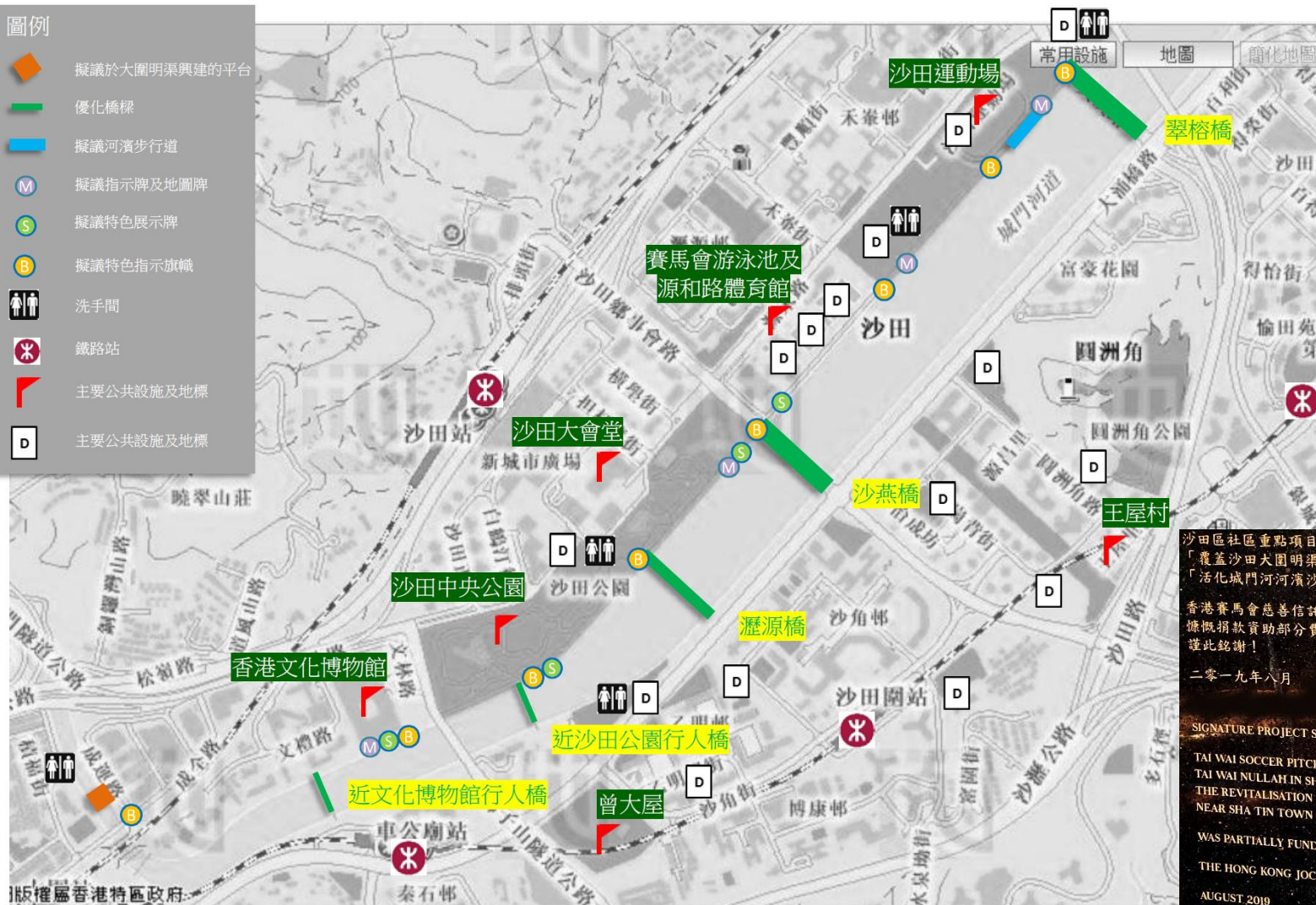


Enquiry Question (2)

How does Shing Mun River channel benefit the HK society?

圖例

- 擬議於大圍明渠興建的平台
- 優化橋樑
- 擬議河濱步行道
- 擬議指示牌及地圖牌
- 擬議特色展示牌
- 擬議特色指示旗幟
- 洗手間
- 鐵路站
- 主要公共設施及地標
- 主要公共設施及地標



沙田區社區重點項目計劃之「覆蓋沙田大圍明渠」項目興建的大圍足球場與「活化城門河河濱沙田市中心段」項目

香港賽馬會慈善信託基金
慷慨捐款資助部分費用
謹此銘謝！

二零一九年八月

SIGNATURE PROJECT SCHEME (SHA TIN DISTRICT) COMPRISING
TAI WAI SOCCER PITCH UNDER THE DECKING OF
TAI WAI NULLAH IN SHA TIN PROJECT AND
THE REVITALISATION OF SHING MUN RIVER PROMENADE
NEAR SHA TIN TOWN CENTRE PROJECT

WAS PARTIALLY FUNDED BY
THE HONG KONG JOCKEY CLUB CHARITIES TRUST

AUGUST 2019

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

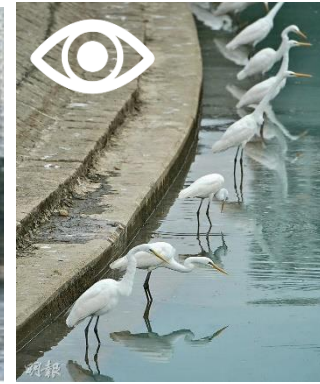
Where and how to collect data

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



➤ By Observation

Facilities along the channel and embankment



➤ By Interview (with questionnaires)



Age group



Purposes of visit

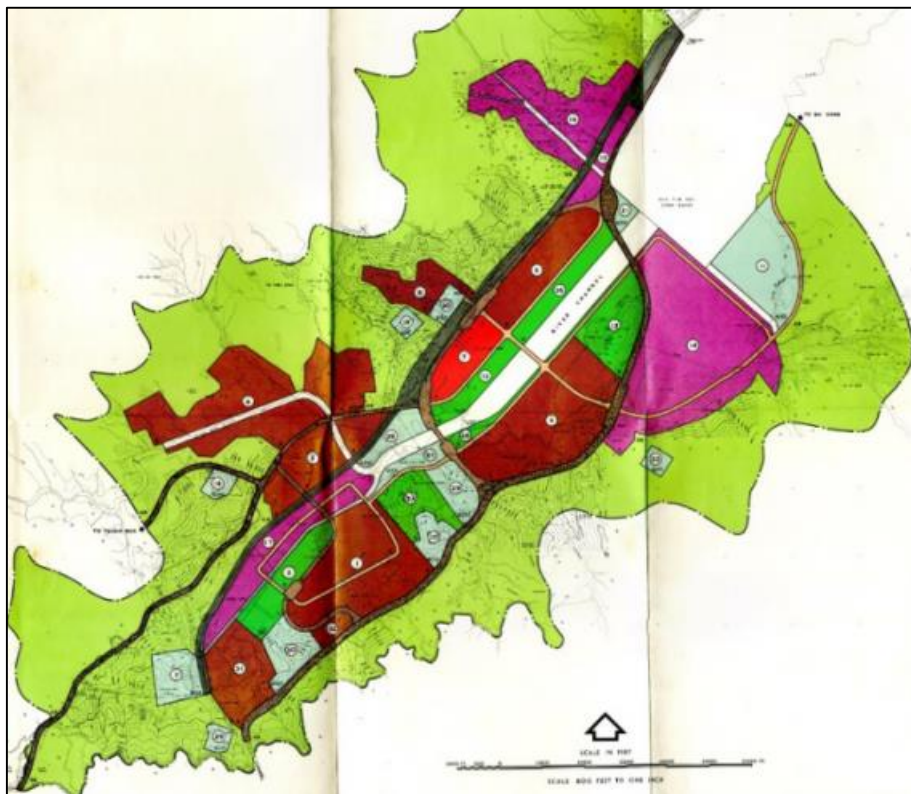


Frequency of visit



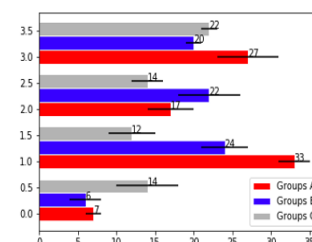
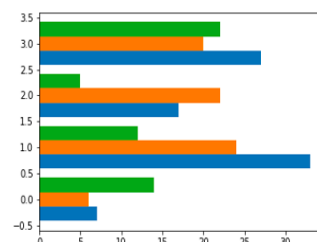
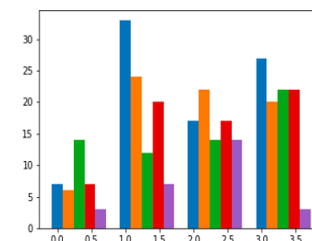
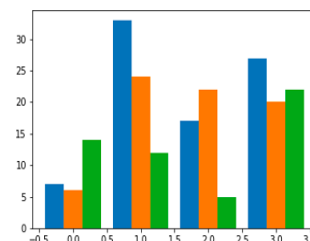
Suggestion for improvement

➤ Draw distribution of recreational facilities



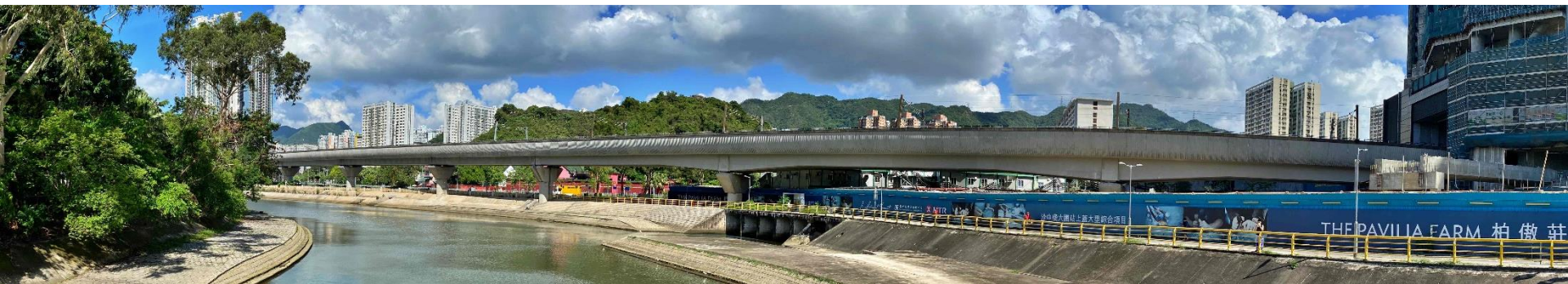
➤ Draw grouped bar graphs

- 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