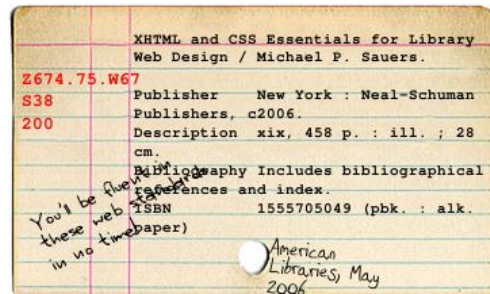# Metadata management for soundscape study

Joe Chun-Chia Huang

What is metadata?

- Data of data
- Original from card catalog of library in 1980s

# Metadata management has been adopted in biodiversity study


Museum collection

Geospatial metadata

# Why metadata is important for biodiversity research?

1. Provide additional information to extend research beyond the samples *per se*
2. Help users to access and mine data efficiently
3. Help researchers to manage data systematically
4. Provide necessary information to justify sample quality
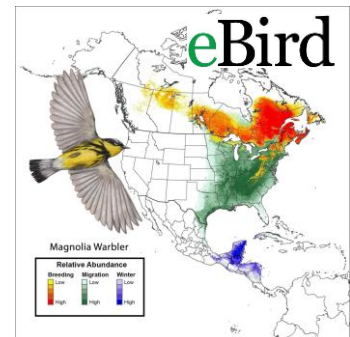
Metadata for Soundscape ecology

1. Large quantity of recordings, especially ultrasoundscape studies. Therefore, systematic data management is necessary.
2. Analysis and exploration of long term recordings are time- and resource consuming, at least, currently.
3. Analyzable data of biological information must be derived from the original files, hence part of the metadata
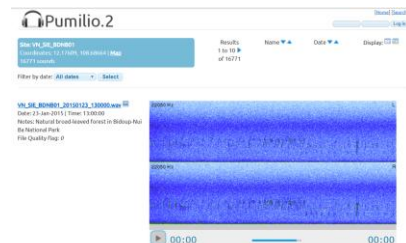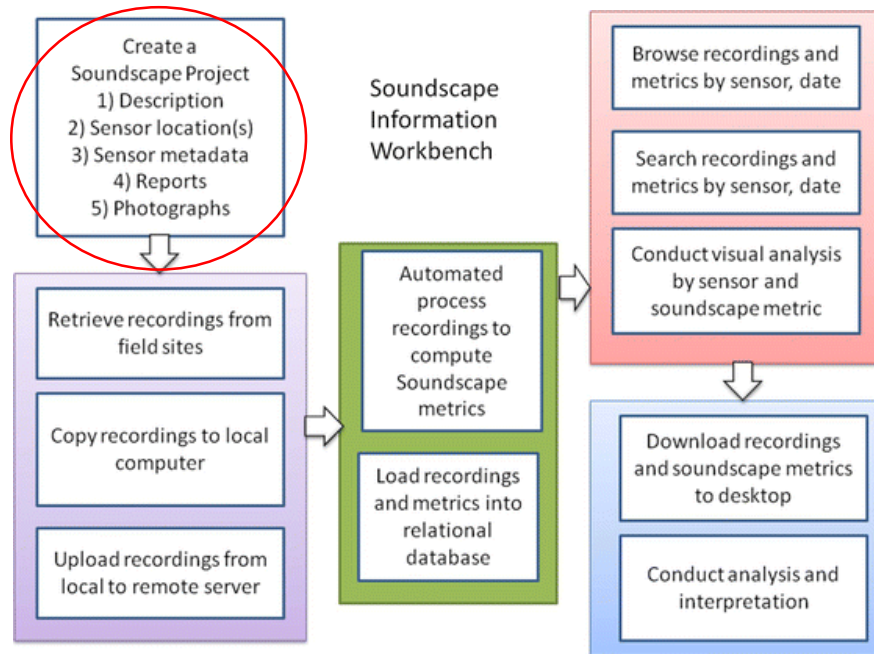
EML(Ecological Metata Language)

An extension of XML (extenable Markup Language) that designed for ecological works by ESA. Used by ESA, GIBIF and associated (e.g. Taibif, Asian Soundscape)

Metadata for Asian Sounscape Network

- SoundscapeDataManagement_2018_US_workshop.xlsx
- 8 worksheet: **EML, project, site. sensor, deployment event**, sampling event, occurrence, taxon

Team up

Each team please finish your metadata spreadsheet by this session

1. Team Cat Tien-**Vy**, Khanhs, Thuan, Cuong
2. Team Cat Ba- **Thong**, Leuong, Q Tuan, Tuan N
3. Team Malaysia Gunung Mulu - **Ellen**, Dao, Tai, Janice
4. Team Malaysia Kubah - **Emy**, Praveena, Hai, Vuong

On May 11, please upload the datasheet to FTP (Janice)

EML sheet-basica metadata

1. Basic description of the dataset (recordings in this case)

	A	B	C
1	EML sections	EML elements	Content
2	Basic Metadata	Title*	Ultrasoundscape in Taiwan ←
3		Publishing Organisation*	Biodiversity Research Center Academia Sinica ←
4		Update Frequency*	Monthly
5		Type*	Sound
6		Subtype	
7		Metadata Language*	English
8		Data Language*	English
9		Data Licence*	TBA(but the data should and will need to open for download with CC-by licence)

For each of the team, I will need to discuss with you together on the legality and permission for opening the recording

EML sheet (filled)

- Description: abstract of the project related to the dataset (I will fill later)
- Resource contacts- person in charge the project associated with the dataset

10	Description*		
11	Resource Contacts*	First Name	Mao-Ning
12		Last Name*	Tuanmu
13		Position*	Assistant Researcher
14		Organisation*	Biodiversity Research Center Academia Sinica
15		Address	Room C208, Interdiciplanary Buildling, No. 28, Section 2, Academia Rd, Nangang District
16		City	Taipei
17		State/Province	
18		Country	Taiwan
19		Postal Code	11529

EML sheet-resource creators

Information about who actually fill the metadata

25	Resource Creators*	First Name	Chun-Chia
26		Last Name*	Huang
27		Position*	Postdoctoal research fellow
28		Organisation*	Biodiversity Research Center Academia Sinica
29		Address	
30		City	
31		State/Province	
32		Country	
33		Postal Code	
34		Phone	
35		Email	
36		Home Page	
37		Personnel Directory	
38		Personnel Identifier	

EML sheet-metadata provider

Information about who in charge the metadata (e.g. yourself or your advisor/boss)

39	Metadata Providers*	First Name	Chun-Chia
40		Last Name*	Huang
41		Position*	Postdoctoal research fellow
42		Organisation*	Biodiversity Research Center Academia Sinica
43		Address	
44		City	
45		State/Province	
46		Country	
47		Postal Code	
48		Phone	
49		Email	
50		Home Page	
51		Personnel Directory	
52		Personnel Identifier	

EML sheet

53	Geographic Coverage	Set global coverage*	24.760N, 121.585E
54		Description*	East Asia
55	Taxonomic Coverage	Description	Echolocating bats
56		Scientific Name*	Chiroptera
57		Common Name	Bat
58		Rank	Order
59	Temporal Coverage		2018/06!2019/09
60	Keywords	Thesaurus/Vocabulary*	n/a
61		Keyword List*	echolocation, soundscape

EML sheet-sampling methods (filled)

87	Sampling Methods*	Study Extent	single point, nightly sampling for consecutive nights for 15 months
88		Sampling Description	recording sounds with a sample rate of 384kHz without trigger and with a high pass filter of 16kHz and a duty cycle of 1 min on and 5 min off using wildlife acoustics SM4BatFS
89		Quality Control	Weather-proof omidirectional ultrasonic microphone set at 1.3m high from ground and point horizontally toward open space under dense forest. Sound analysis will be carried using computer automatically with open tool
90		Step Description	(as in the instructions)

8

Project(filled)

	A	B	C	
1	projectID	projectTitle	projectDescription	p
2	TW_BRCAS_201803	Evesdropping the impacts of extreme climate events to ultrasoundscape in the ∧	Monitoring the associations between echolocating bat diversity and climate in Taiwan and Southeast Asia using acoustic technique	T
3				
4				

Automatic generated

	D	E	F	G	H	I	J
1	projectCountry	projectCountryCode	projectOrganization	projectOrganizationCod	projectYearMonth	contactPerson	contactEmail
2	Taiwan	TW	Biodiversity Research Center of Ac	BRCAS	201803	Mao-Ning Tuann	mntuanmu@gate.sinica.edu.tw
3							

Site

	A	B	C	D	E	F
1	projectID	siteID	siteCountry	siteCountryCode	siteName	siteCode
2	TW_BRCAS_201803	_BRCAS_TW_FS	Taiwan	TW	Fushan Botanic Garden	FS
3						

Select from list   Automatic generated

	G	H	I	J	K	L	M	N	C
1	decimalLatitude	decimalLongitude	coordinatePrecision	geodeticDatum	coordinateUncertaintyInMeters	elevationInMeters	siteHabitat	landOwnership	
2	24.7596	121.5851		WGS84		10	646 Subtropical montane secondary ▶	Taiwan Forestry Research Institute	
3									

Major landscape type

Degree-minute-second-decimal places

Sensor

	A	B	C	D
1	sensorID	sensorType	sensorModel	sensorSerialNumber
2	WASM4BATSF_0001	Passive sound recorder	WildlifeAcousticsSM4Ba▸	S4A02085

Fill # of the current recorder but change later

	F	G
	samplingRate	samplingSchedule
	384kHz	start at 17:00; 1 minutes on; 5 minutes off; end at 07:00

	H	I	J	K	L	M	N	O
	triggerLevel	highPassFilte▸	micModel	micSerialNumber	dataLoggerModel	dataLoggerSerialNumber		
	off	16k	SMMU1		HoboOnsetU23-001			

Fill # of the current mic model but change to U2 later

Deployment event

	A	B	C	D	E	
1	projectID	trapLocationID	deploymentStartDate	deploymentID	sensorID	start
2	TW_BRCAS_201803	TW_BRCAS_TW_FS01_01	20180509	TW_BRCAS_TW_FS01_01_20180509	WASM4BATFS_0▸	5,

projectID-countryID-siteID-# of Mic   Automatic generated   Select from list

	F	G	H	I	J	K
	startDateTime	startedByWhom	endDateTime	endedByWhom	workingStatus	deploymentNote
	5/09/18 04:00 PM	Joe Chun Chia Huan▸	2018-05-09 08:00:00	Joe Chun Chia Huan▸	normal	Battery 6.2V, A: 43/256, B:

Sampling event, occurrence and taxon metadata

- Data analysis workshop (2019)