

Embedding and Exporting Stationary Acoustic Metadata in Kaleidoscope

The following document provides guidance for embedding and exporting metadata in stationary acoustic recordings using Kaleidoscope auto ID software. Guidance for processing mobile transects can be found at <u>https://www.science</u> <u>base.gov/catalog/file/get/5e3de185e4b0edb47be3d6e6?name=Kaleidoscope</u> <u>Mobile_Transect_Guide.pdf.</u>

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Embedding Survey Metadata

1. Open Kaleidoscope and click "Browse" to select the input directory of the folder containing your .wav/.zc files. Select the box beside the type of input files (WAV/ZC).

NOTE: Select a folder containing all data for a single detector deployment (all nights at a single site). This is the broadest selection for which all files will share the same metadata (SITE NAME, LATITUDE, LONGITUDE, etc.).

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Default Project Form 2 Contest This is the Kaleidoscope built-in default project 8 Division R form 8.3 file names Name your batch Use .zc instead				
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- Download the required NABat metadata forms from https://www.sciencebase.gov/catalog/item/5dcdd2b5e4b069579760b15a (NABat_Metadata_Form_Kaleidoscope_ Stationary.xml for use with steps 1-9 and NABat_Stationary_Meta_Output_Only_KPRO.xml for use with steps 12-18). Next, click the drop-down menu above the "Default Project Form" and select "Add or Replace a Project Form." Navigate to NABat_Metadata_Form_Kaleidoscope_ Stationary.xml and select the file. The NABat metadata form will now load in the bottom of the INPUTS section (the left half of the Kaleidoscope window).
- 3. Complete all metadata fields for which you have data. Required fields are listed below. Some fields require specific formatting. Hover the pointer over a field for formatting tips and/or a list of accepted entries.

Required NABat metadata fields:

GRTS Cell ID OR Lat/Long Location Name Software Type Survey Start Time Survey End Time Species List

- * link to species list guidance in step 6
- 4. Once all required metadata fields (and any additional fields for which you have data) have been completed, select the desired output directory to save processed files by clicking "Browse" in the top right of the window.

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Bat Analysis Mode 🛛 🗸	Use 9/9 compute resources $~~$
\checkmark Batch \checkmark Signal Params \checkmark Auto ID for Bats \checkmark	Cluster Analysis × Noise Analysis ✓ Cloud ✓ Db
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Input directory:	Output directory:
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Drive label (nickname) for database (option	Drive label (nickname) for database (optional):
✓ Include subdirectories	Nightly ~ Create subdirectories
WAC files	Split to max duration, seconds
WAV (and W4V) files	WAV (or W4V) files
Auto ~ Time expansion factor	Split channels
ZC files	None Compression
0.00000 Fuzz GPS to precision	1 × Time expansion factor
Kaleidoscope Metadata Stationary 🗸 🗸	ZC files
NABat Project Form	20 mes
NABat Project Form from v10 of the Acoustic	8.3 file names
Workflow Guidance	Use .zc instead of .??#
	Move noise files to NOISE subfolder
Location Name	V
< >	Extract GPS Disabled \checkmark 60 secs
Please send us feedback! Video Tutorials	Help Process Files
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5. Once the output directory has been selected, choose "Nightly" from the "Create subdirectories" drop-down menu to keep new files organized by detector night. Next, select the type of output files you wish to create, WAV or ZC (ZC files cannot be converted to WAV). In order to successfully export metadata, you *must* select WAV or ZC files in the OUTPUTS window and create copies of the original files during this step. These copies will contain embedded metadata that will be the source of the "meta" output spreadsheet you will upload to NABat.

Users with zero crossing files that end in the .# extension rather than .zc should select the "8.3 file names" and "Use .zc instead of .??#" options below "ZC files." Otherwise, Kaleidoscope will remove the seconds from the filename, increasing the likelihood of duplicate filenames

(resulting from distinct files recorded within the same minute) that will create errors when uploading metadata to the NABat database.

- 6. Next, click the "Auto ID for Bats" tab at the top of the window. Select "Bats of North America" from the "Classifiers" drop-down menu. Select "+ 1 More Accurate (Conservative)" from the drop-down menu at the top right. Next, select your state/region from the drop-down menu below the list of species. Species can be manually added or removed based on specific knowledge of species assemblages in your area, but this must be reflected in your NABat species list. (guidance on creating an NABat species list is available at https://www.sciencebase.gov/catalog/file/get/5e3de185e4b0edb47be3d6e6?name=Create_NABat_Species_List.pdf)
- 7. Click "Process Files" in the bottom right corner of the window.

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✓ Batch ✓ Signal Params ✓ Auto ID for Bats ✓ Cluster Analysis X Noise A CLASSIFIERS	nalysis	✓ Cloud	√ Db	
Bats of North America 5.1.0 v 0 Balanced (Neutral) v ANTPAL - Antrozous pallidus - Parthat CORTOW - Corynorhinus townsendii - Ornsend's big-eared bat EPTFUS - Eptesicus fuscus - Big brown bat EUDMAC - Euderma maculatum - Spotted bat EUMFLO - Eumops floridanus - Florida bonneted bat EUMPRE - Eumops perotis - Greater bonneted bat EUMVND - Eumops underwoodi - Underwood's bonneted LASBLO - Lasiurus blossevillii - Western red bat LASBOR - Lasiurus borealis - Eastern red bat LASCIN - Lasiurus cinereus - Hoary bat Select by region About				
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- 8. When Kaleidoscope has finished processing, review the automated identifications and confirm or downgrade the Kaleidoscope ID (manual ID). For stationary surveys, NABat guidance calls for one manual call verification per species per night in order to establish presence/absence. For mobile transects, NABat guidance calls for manual verification of all call files in order to estimate abundance.
- 9. If the detector model you're using automatically embeds a date/time stamp into call files, these data should auto-populate and appear in the "Audio Recording Time" column of the Kaleidoscope "meta" output. If so, you may skip the renaming process. However, before uploading metadata to NABat, you should ensure that the "Audio Recording Time" column contains data. Otherwise, file names must adhere to NABat's naming format, and users should

follow the guidance in step 10. If the "Audio Recording Time" column successfully autopopulates, you may skip to step 11.

10. To rename files, open the NABat file renamer (available for download at https://github.com/talbertc-usgs/GuanoMDEditor/releases/tag/0.0.1) or download the R script for renaming acoustic files (available for download at https://www.sciencebase.gov/catalog https://github.com/talbertc-usgs/GuanoMDEditor/releases/tag/0.0.1) or download the R script for renaming acoustic files (available for download at https://www.sciencebase.gov/catalog files.R). If using the NABat file renamer, navigate to the folder containing the files you just created with metadata and IDs (this will be a subfolder within the output folder from step 4). Rename all files to ensure they are consistent with NABat naming format and to remove the _000 appended by Kaleidoscope:

NABat naming format: GRTSID_SITENAME_YYYYMMDD_HHMMSS.wav/zc

(e.g. 3773_SW_20190813_215333) *Fields MUST be separated by an underscore. Any other symbol or character will cause errors and files won't be recognized by the NABat system.

Additional guidance on using the NABat file renamer is available at <u>https://www.sciencebase</u>.gov/catalog/file/get/5e3de185e4b0edb47be3d6e6?name=Preparing_Acoustic_Files.pdf

- Repeat steps 1-10 for all deployments you wish to process. Once completed, steps 12-18 will allow users to simultaneously export metadata for all processed deployments into a single bulk upload CSV.
- 12. Return to the batch processing window, click "Browse" in the "Input directory" window, and select the parent folder containing all your processed deployments (the new files you created with metadata and IDs in steps 1-9). Select a new output directory. If the box beside "WAV files" or "ZC files" is still checked, unselect the box (you won't be creating new files this time, only a "meta" file containing NABat metadata).
- 13. Click the "Auto ID for Bats" tab and select "DISABLED" in the "CLASSIFIERS" drop-down menu.
- 14. Replace the NABat_Metadata_Form_Kaleidoscope_SurveyType.xml file from step 2 with NABat_SurveyType_Meta_Output_Only_KPRO.xml. The data entry window will no longer include NABat metadata fields, however, the form will still export the embedded metadata from steps 1-9.
- 15. Click "Process Files" in the bottom right corner of the window.
- 16. Navigate to the current output directory folder and open the "meta" file. Check to ensure all fields for which you entered data are filled, and ensure one or both of the Auto Id/Manual Id columns are filled.
- 17. Rename the file with a descriptive and unique name and save (the NABat system will automatically overwrite duplicate file names with the most recent version, so it is critical that your file name is unique). Next, open your NABat project page, click the blue "Upload Survey Data" button in the top right, select "Stationary Acoustic Point," click "Full Metadata," and select the Kaleidoscope "meta" file you just renamed.
- 18. Once the file is selected, a preview window will appear with any errors highlighted in red. Correct any errors (use the drop-down menus to determine the correct formatting and accepted inputs), save the updated file, click the refresh button in the top left of the preview window, and

select the corrected file. Ensure all errors have been corrected and submit the metadata file to your project page.

3 Test_Meta.csv				
/ Survey of Time i	✓ Survey End Time	✓ Detector (i	✓ Detector Serial Number i	✓ Microphon
mestamp e.5 12/25/2018 12/25/2018 10:00 PM 12/25/2018 20:00:00 12/25/2018 08:00:00 AM 2018-12-25120:50:58 required	Timestamp e.g. 12/25/2018 12/25/2018 10:00 PM 12/25/2018 20:00:00 12/25/2018 08:00:00 AM 2018-12-25T20:50:58 Required	BINARY ACOUSTIC AR125	String	Pettersson M50
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1/2015, 8:30:00 PM	7/8/2015, 5:45:00 AM	Anabat Swift		
1/2015, 830:00 PM	7/8/2015, 5/45:00 AM	Anabat Swift		
1/2015, 8:30:00 PM	7/8/2015, 5:45:00 AM	Anabat Swift		
1/2015, 0:30:00 PM	7/8/2015, 5/45:00 AM	Anabat Swift		
1/2015, 8:30:00 PM	7/8/2015, 5:45:00 AM	Anabat Swift		
1/2015, 8:30:00 PM	7/8/2015, 5:45:00 AM	Anabat Swift		
1/2015, 8:30:00 PM	7/8/2015, 5:45:00 AM	Anabat Swift		
1/2015, 8:30:00 PM	7/8/2015, 5:45:00 AM	Anabat Swift		
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Rows with errors are dropped/ignored by the NABat system, so it is crucial that errors are corrected before the file is uploaded. Otherwise, metadata for those rows will not be saved in the NABat database.

Once the metadata file has successfully uploaded, it should appear under the "Bulk Upload" tab of your project homepage. The number of rows processed and rows with errors will be listed. If errors are present in the uploaded document, click the blue hyperlink in the "Errors Found" column to download a CSV identifying which rows have errors and what error occurred (final two columns of the document).

EST PROJECT	s Species Lists Acoustic Data Colony Court Data Bulk Up	skad Status		NABat Guide	ince Documentation 😧 🌔 Cell Sel	ction lool ┥ 🚺 UpA	oad Audio Recordings 🛔 🛓 🔋 🚯 Upload Survey Data 🛔 🛓
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ationary Acoustic	2018_California_P5_Shasta-Trinity_2.csv	Dane Smith	Oct 17, 2019 1:3048 PM	5319	0 Emor(s)	Done	Undo D Reprocess C
ationary Acoustic	CA-TEST-1.cm	Dane Smith	Oct 17, 2019 1:25:18 PM	500	0 Emor(s)	Done	Undo 🔊 Reprocess C

Appendix: Accepted Categorical Values for NABat Stationary Acoustic Metadata

NABat | Activation start time:

YYYY-MM-DDTHH:MM:SS (e.g. 2019-07-13T20:30:00) *NOTE: Date and time must be separated by T

NABat | Activation end time:

YYYY-MM-DDTHH:MM:SS (e.g. 2019-08-15T06:30:00) *<u>NOTE</u>: Date and time must be separated by T

NABat | Detector type:

BINARY ACOUSTIC AR125 | BINARY ACOUSTIC AR125-FG | BINARY ACOUSTIC AR180 | BINARY ACOUSTIC AcroBat | BINARY ACOUSTIC iFR-V | PETTERSSON D1000x | PETTERSSON D240x | PETTERSSON D500x | PETTERSSON M500 | TITLEY AnaBat Express | TITLEY AnaBat SD1 | TITLEY AnaBat SD2 | TITLEY AnaBat Swift | TITLEY AnaBat Walkabout | WILDLIFE ACOUSTICS EM-Touch | WILDLIFE ACOUSTICS EM-Touch2 | WILDLIFE ACOUSTICS EM-TouchPRO | WILDLIFE ACOUSTICS

NABat | Microphone type:

Pettersson M500|TITLEY AnaBat Swift|Wildlife Acoustics SM3-U1|Wildlife Acoustics SMM-U1|Wildlife Acoustics SMM-U2|Wildlife Acoustics SMX-U1|Wildlife Acoustics SMX-US|Wildlife Acoustics SMX-UT|generic Directional|generic Extended Mic|generic Hi-Mic|generic Internal|generic Omni-directional|generic Regular

NABat | Microphone orientation:

e|n|ne|nw|s|se|sw|w

NABat | Type of clutter:

Building | Other | Rock | Vegetation | Water

NABat | Habitat type:

agriculture|barren land|forest-conifer|forest-deciduous|grassland|shrubland|urban|water|wetland

NABat | Weatherproofing:

TRUE | FALSE

NABat | Software Type

Kaleidoscope 3.x|Kaleidoscope 4.0.0|Kaleidoscope 4.3.x|Kaleidoscope 4.5.0|Kaleidoscope 4.5.4|Kaleidoscope 4.5.5|Kaleidoscope 4.5.x|Kaleidoscope 4.x|Kaleidoscope 5.0.x|Kaleidoscope 5.1.x|Kaleidoscope 5.2.x|Kaleidoscope x