

Southeast Coast Network

National Park Service
Inventory and Monitoring Division



Standard Operating Procedure 1.4.33

Classification of Anuran Vocalization Recordings—Version 1.1

Please cite this as:

Parrish, M. C. 2024. Classification of anuran vocalization recordings—Version 1.1. Southeast Coast Network Standard Operating Procedure NPS/SECN/SOP—1.4.33. Southeast Coast Network, Athens, Georgia.

Summary

Automated recording devices are deployed in the field to record anuran vocalizations as part of the Protocol for Monitoring Vocal Anuran Communities in Southeast Coast Network Parks (Byrne et al. 2013). Up to 410 hours of audio recordings may be captured each year a park is sampled. This standard operating procedure (SOP) outlines a multi-tier and semi-automated approach to reviewing and classifying anuran calls captured in ARD recordings. Automated processes in program Kaleidoscope Pro 5 (Wildlife Acoustics, Inc. 2022) first identify and cluster most signal detections in recordings (i.e., anuran vocalizations plus additional natural and artificial sounds), and are followed by expert, manual review and classification of a subsample of detected signals. The results provide information on anuran community richness and species occupancy at each sampling location within parks.

This SOP is intended to replace guidance from SOP 1.4.20 *Manual Evaluation of Automated Recording Device Files—Version 1.0* (Byrne 2013) and SOP 1.4.21 *Vocalization Identification Quality Assurance and Quality Control Procedures—Version 1.0* (Byrne and Smrekar 2012) regarding manual evaluation of ARD recordings of anuran vocalizations.

Revision Log

Revision Date	Author	Changes Made	Reason for Change	New Version #
05/25/2023	MC Parrish	SOP 1.4.20 and SOP 1.4.21 covered manual evaluation of audio using now-obsolete software which required updates to the approaches used for processing of recordings. This document clarifies the classification approach using modern software and includes instruction on QA/QC and data management.	New SOP	1.0
08/05/2024	MC Parrish	Removed paragraph referring to obsolete database.	New SOP in development to cover data management.	1.1

Contents

	Page
Overview.....	4
Required Software and Hardware for Review of Field Recordings	5
Procedure for Cluster Analysis in Kaleidoscope Pro.....	5
QA/QC of Manual Classifications and Data Management.....	10
Quality Assurance: Classification Accuracy Check.....	10
Quality Control: Datasheet Transcription Validation.....	11
Records Management	11
Acknowledgements.....	12
Literature Cited	13
Appendix A. Scientific Names and Alpha Codes	14
Appendix B. Data Sheets	16

Overview

Automated recording devices (ARDs) are deployed each spring at five out of 15 parks in the Southeast Coast Network (SECN). The ARDs are used to record avian vocalizations as part of the Vocal Anuran Community Monitoring Protocol (Byrne et al. 2013). Recording takes place on 21 sampling nights during an 81-day period between March 10 and May 30. On sampling nights, each ARD records audio for 60 seconds every 20 minutes throughout the night, from 18:00 to 06:40. (Note: from 2012 to 2020, the recording schedule was 30 seconds every 10 minutes from 18:00 to 06:50; beginning in 2021, it changed to 60 seconds every 20 minutes due to changes in available recording equipment.) Up to 30 separate locations are sampled at each park. Parks are revisited on a three-year rotating basis, so each park is visited once every three years.

In a single sampling season, each ARD records 819 minutes of audio at every sampling location in a park (i.e., 410 hours of audio are captured for a park containing 30 sampling locations). It is not possible, given personnel constraints, to manually review all recordings. Instead, program Kaleidoscope Pro 5 (Wildlife Acoustics, Inc. 2022) is used to automatically review all recordings at a park and to extract as many signal detections as possible. Signal detections may represent any natural or artificial acoustic departure from the background soundscape, and may be anything ranging from a frog call, a bird song, rhythmic insects, rain, wind, or human noises. Kaleidoscope Pro 5 then clusters the signals into groups, according to mathematical similarity.

Ideally, this would result in “pure” clusters all containing a single type of signal (e.g., a cluster of only *Hyla cinerea* vocalizations). However, given the complex natural jumble of sounds present in the background soundscape, Kaleidoscope Pro 5 tends to produce more heterogeneous clusters. Consequently, SECN personnel have developed a multi-tiered and semi-automated approach to analyzing recordings. The approach uses automated processes to eliminate much of the inconsequential noise in recordings before a manageable subset of suspected-valid signals are extracted and manually evaluated by experts. One of the project’s long-term goals is to develop a more fully-automated approach to classifying sampled vocalizations but currently, manual classification work is performed by experts familiar with the calls of anurans of the Southeast Region.

This standard operating procedure (SOP) replaces guidance from SOP 1.4.20 *Manual Evaluation of Automated Recording Device Files—Version 1.0* (Byrne 2013) and SOP 1.4.21 *Vocalization Identification Quality Assurance and Quality Control Procedures—Version 1.0* (Byrne and Smrekar 2012) regarding manual evaluation of ARD recordings of anuran vocalizations. SOP 1.4.20 refers exclusively to analyses using legacy software (SongScope). Our experience while developing this approach to reviewing recordings has shown that it generally results in the direct review of 15–20% of total detected signals (i.e. vocalizations). Compare this to the earlier approach (SOP 1.4.20; Byrne 2013) that suggested a manual review of 10–12.5% of all recorded audio (i.e., large portions of the audio files that may not have contained any signals of interest). The SOP 1.4.21 discusses an obsolete QA/QC (quality assurance/quality control) process based on a software package and analysis technique that is no longer in use.

Required Software and Hardware for Review of Field Recordings

- Windows 10 laptop with dual monitors and sufficient memory.
- Kaleidoscope Pro software, version 5.4.2 or higher (Wildlife Acoustics, Inc. 2022).
- High-quality, noise-cancelling, over-ear headphones. Currently, the Southeast Coast Network uses Sony WH-1000XM3 Wireless Noise-Canceling Over-Ear Headphones.
- Data sheet MP-06 (one copy per sampling location).
- Anuran call and anuran natural history reference materials.

Procedure for Cluster Analysis in Kaleidoscope Pro

The trained audio technician or wildlife biologist is responsible for semi-automated classification of the anuran vocal recordings according to the procedure below.

1. Obtain data sheet MP-06, “Auditory Classification of ARD Anuran Vocal Recordings” (Figure B-1 in Appendix B) from the SECN network drive: S:\Monitoring\Anuran\Protocol-SOPs\Forms

Black ink pen or fine-tipped permanent marker is used when filling in the data sheet, in order that writing remains legible if scanned or copied.

2. Locate the set of recordings for the desired sample location and year (Table 1). Take note of the file folder location. Raw recordings are available on the SECN network drive:

S:\Monitoring\Anuran\Data\RawAudioFiles

Table 1. Measurement Quality Objectives for anuran community monitoring protocol.

Task	Measurement/ Quality Indicator	Quality Objective
Site Recon	Location Accuracy	Sample location within +/- 10 m of established waypoint.
Site Establishment	Location Accuracy	+/- 10 m (horizontal)
	Location Description Detail	Description provided with enough detail to assist relocation with use of GPS equipment
	Applicable SOP	SECN SOP 1.4.31
Microphone Calibration and Audio Recording	Microphone calibration	Left and right microphones pass testing with standard microphone calibrator: SongMeter 4 (pass: -35 ± 4 dB); SongMeter Mini (pass: > -16 dB).
	Applicable SOP	SECN SOP 1.4.01

Task	Measurement/ Quality Indicator	Quality Objective
Audio Recording Parameters	Channel	Stereo
	Gain (Left/Right)	16.00 db (SongMeter 4) or 18.00 dB (SongMeter Mini)
	Preamp (Left/Right)	26 dB (SongMeter 4)
	Hi Pass Filters (Left/Right)	Off (SongMeter 4)
	Sample Rate	32 kHz
	File Format	*.WAV (uncompressed)
	Applicable SOP	SECN SOP 1.4.01
Anuran Audio Classification	Taxonomic Resolution	Identifications made to the species level
	Identification Accuracy	90% accuracy for audio observations
	Identification Completeness	90% of discernable observations identified to species level

- Fill in **Survey Year**, **Park Code**, and **Sample Location** at the top of the sheet. Fill in **Listener** (the reviewer's initials), **Date Listened** (day the analysis is performed), **Count of Files Analyzed**, **Recordings Start and End Dates** (see note below), **Recordings Start and End Times** (see note below), **File Format** (WAV or WAC), **Sampling Rate** (equal to two times the maximum frequency (kHz) recorded in each file), and **Channel(s) Reviewed** (see note below).

Also fill in **Kaleidoscope Software Version** (version info number can be found on the Kaleidoscope taskbar under Help > About). Kaleidoscope Pro version 5.4.2 or greater must be used for this procedure.

Notes: The optimal start and end dates of recordings are March 10 and May 30 (an 82-day period). Depending on field deployment logistics, recordings may exist for dates outside the above, or recordings may have begun later than March 10 for a variety of reasons. Select recordings representing an 82-day period (preferably from the above dates) and recordings falling outside that range are not utilized in this analysis.

Field recording occurs between 6:00 p.m. and 7:00 a.m. Although anurans do sometimes vocalize during the dusk and dawn hours, many extraneous vocalizations (particularly birds) cause the recordings between 6:00 p.m.–8:00 p.m. and 05:00 a.m.–7:00 a.m. to contain disproportionate numbers of non-anuran vocalization detections. To streamline analysis, only recordings from the time period of 8:00 p.m.–4:50 a.m. are analyzed in Kaleidoscope Pro.

Generally, only the left microphone channel input will be reviewed. However, in the event a problem with that microphone is identified, either the right channel or combination of both right and left channels may be analyzed as alternates. Typically, the left input is expected to be identical to the right input since the microphones on SongMeters are omnidirectional.

4. Open Kaleidoscope Pro. Use the pull-down lists in the upper right and upper left to select **Non-Bat Analysis Mode** and **Use 9/9 Compute Resources** (this option may need to be adjusted downwards if the program fails to run successfully).

5. Next, input the following program settings:

- a. **Batch Tab:**

- i. **INPUTS**

1. **Input Directory:** Browse to the directory containing the recordings to be analyzed.
 2. **Include Subdirectories:** (check the box)
 3. **WAC Files:** (check the box if the input directory contains .WAC files.)
 4. **WAV (and W4V) Files:** (check the box if the input directory contains .WAV files)

- ii. **OUTPUTS**

1. **Output Directory:** A new directory is specified for each sample location analyzed so that detection outputs and interpretations are preserved for each location. The annotated *cluster.csv* file is ultimately stored on the SECN server:

S:\Monitoring\Anuran\Data\AnnotatedClusters\YYYY\PPPP\PPPPSSS

...where YYYY refers to the survey year; PPPP refers to the four-letter park code; and SSS refers to the three-digit sampling location number.

2. **Channel Selection:** (Select: “*Process only left input channel*”).

- b. **Signal Params Tab:**

- i. **Signal to be detected:**

1. **Minimum and Maximum Frequency Range (Hz):** 250 – 7250
 2. **Minimum and Maximum Length of Detection (s):** 0.5 – 20.0

3. **Maximum inter-syllable gap (s): 4**

c. **Cluster Analysis Tab:**

i. **Cluster Analysis:**

1. **Pull-down menu:** (Select “*Scan and cluster recordings to create cluster.kcs and cluster.csv.*”)
 2. **Max distance from cluster center to include outputs in cluster.csv:**
1.0
 3. **FFT Window:** Select “*FFT Window 5.33 ms*”
 4. **Max States:** 12
 5. **Max distance to cluster center for building clusters:** 0.7
 6. **Max clusters:** 500
6. Click **Process Files** to initiate the clustering procedure. The program will open two windows when the procedure is completed: Results (*cluster.csv*) and Viewer.
7. Scroll to the bottom of the Results output and fill in the data sheet fields: **No. of Detections** (row count) and **No. of Clusters** (the number of clusters created; remember, clusters are numbered beginning with 0, in the *TOPIMATCH* field).

Next, the user will begin listening to signal detections and classifying them to species. The number of signal detections is expected to average 1,000 or more, each up to 20 seconds long. The sheer volume of potential signals presents logistical difficulties in terms of personnel time constraints.

Consequently, a subset consisting of the first five signal detections in every cluster will be manually reviewed and considered representative of anuran communities present at the sample location.

1. Set up the Viewer window to display frequencies ranging between 0.0 kHz and 8.0 kHz. Adjust brightness (volume) and contrast of the sonogram to productive levels. A full technical discussion of the use of Kaleidoscope Pro is beyond the scope of this SOP. For greater guidance, obtain training from a current user or reference the user guide (Wildlife Acoustics, Inc. 2022).
2. Open the Metadata Panel and set up custom buttons for commonly used classifications. Many signals reviewed will be non-anuran in origin (e.g., anthropogenic noise, birds, mammals, insects, or rain). A useful setup for the custom ID buttons may include similar assignments as shown in Figure 1.

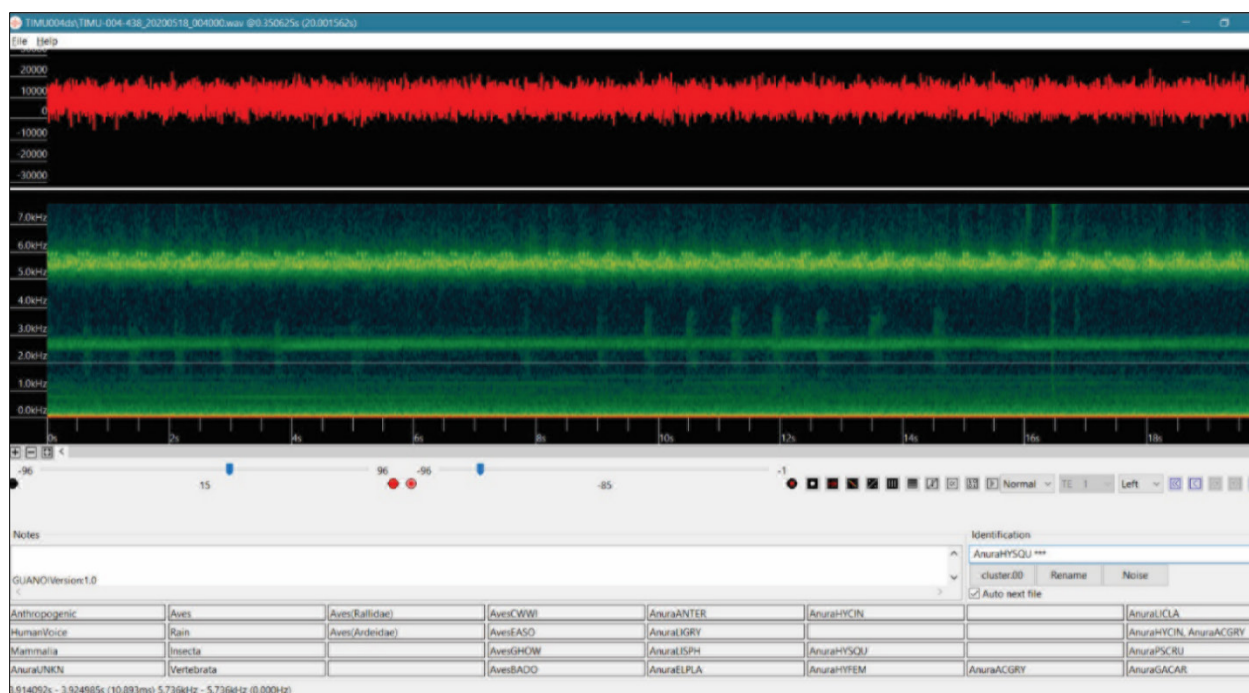


Figure 1. Custom buttons are assigned in a Kaleidoscope Viewer window to allow the user to rapidly classify commonly encountered signals (e.g., non-anuran animal and insect sounds, weather, and anthropogenic noises). Buttons beginning with “Anura” prefix refer to frequently-detected anurans by their 5-letter alpha codes. If novel or multiple species are encountered, they can be entered directly in the **Identification** box, separated by commas. A definitive anuran vocalization is indicated with three asterisks.

3. For each cluster, review the first five signal detections using audio and visual (sonogram) cues. If necessary, refer to other resources, such as call reference CDs or reference sonograms and ID comments stored at SECN HQ. For each reviewed detection, enter a species classification in the **Identification** box in the Viewer. The Results table will be automatically updated and the classification will appear in the **Manual ID** column.
4. As each new species for the location is classified, enter only the species alpha code on the **Signal Detections** portion of the data sheet (do not include **Recording Date**, **Recording Start Time**, and **Time Offset** at this time). See Appendix A for a list of species known or with potential to occur in SECN parks, as well as their associated alpha codes.

When all classifications for the location are complete, go to the Results window and sort the Manual ID column by name. Enter the total number of detections that were reviewed on the data sheet next to **Detections Reviewed**.

Note: Because audio classification work is very demanding on the technician’s concentration and focus, it is suggested for every 90 minutes of classification work, 10 minutes should be spent on a break, performing tasks requiring less focus.

5. Next, briefly review all detections of each anuran species to find the most representative and easy to identify signal. For example, if 20 detections of *Dryophytes cinereusa* were made, review each one and choose the clearest, most definitive detection. On the data sheet, enter the **Recording Date**, **Recording Start Time**, and **Time Offset** for the definitive recording of each species. This serves as the record of occurrence for each species making up the community at the sample location.
6. If there is doubt regarding a record of occurrence, mark the **Flag** column and the wildlife biologist will later give additional review attention to that record.
7. Enter **General Comments** on the data sheet (optional).
8. The data sheet is now complete and contains a record of all anuran species occurring in at least one reviewed signal detection.
9. When all initial classification work is completed for a park, submit the original datasheets to the wildlife biologist. The Southeast Coast Network biologist will scan the original datasheets into PDF format and will store them on the SECN server (see Records Management, below).

QA/QC of Manual Classifications and Data Management

Quality Assurance: Classification Accuracy Check

After receiving the data sheets, the SECN wildlife biologist will make a copy of the sheets for use during QA/QC (quality assurance/quality control) steps. Any notations or sign-offs will occur on the QA/QC data sheet copies. For quality assurance, the wildlife biologist will review the definitive recording for each species indicated on each data sheet (i.e., they will perform a 100% review). If a technician performed the initial classification, the biologist may begin the QA review at any time. If the biologist performed the initial classification, they should wait at least 24–48 hours after completion to revisit the recordings with a fresh perspective.

The audio recording corresponding to each species detection record is reviewed by the biologist. If the biologist approves the ID, then no further action is taken. If the biologist questions the original species identification, the biologist will use professional judgement combined with consultation of other ID resources (e.g., call CDs, internet, and print resources) to either confirm or reject the original classification. If other signal detections were also classified as the species in question, the biologist may review other recordings to determine if they may have captured a more definitive recording for that species. If no definitive recording can be located, the species will be omitted from the sample location's anuran community list.

Upon completion of the QA review, the biologist shall sign and date the data sheet, indicating it is ready to proceed to data entry and eventual QC review.

Quality Control: Datasheet Transcription Validation

This guidance on QA/QC of anuran vocalization recordings replaces that found in SOP 1.4.21 *Vocalization Identification Quality Assurance and Quality Control Procedures—Version 1.0* (Byrne and Smrekar 2012).

Data entry and QC-review occurs in three stages.

1. A data entry technician transcribes data from the QA-passed data sheets (provided by the wildlife biologist) into an Excel spreadsheet. Upon completion, the technician adds entries to the columns for **Transcription Date** and **Transcription Tech** (technician's initials). The data are considered "raw" at this point.
2. After a minimum of 24 hours following original data entry, the data entry technician validates the transcribed raw data against the original data forms, line-by-line, correcting any transcription errors. Upon completion, the technician adds entries to the columns for **Provisional Date** and **Provisional Tech** (technician's initials). The data are considered "provisional" at this point.
3. The wildlife biologist validates the provisional transcribed data against the original data forms again, line-by-line. No errors should normally appear at this stage. Any that do are corrected. Upon completion, the wildlife biologist adds entries to the columns for **Accepted Date** and **Accepted Authority** (biologist's initials). The electronic data are now considered "accepted" and are ready for any further analysis and reporting.
4. The biologist will scan approved data sheets into PDF format and store them on the SECN server (see Records Management, below).

Records Management

1. Organize data sheets (MP-06) sequentially for each park, by sample location number.
2. For each park, generate a high-quality (600 DPI) PDF scan of the packet of sheets.
3. Name the PDF according to the format:

ManualAnuranClassifications-YYYY-PPPP-ssss.pdf

where *YYYY* is the sample year, *PPPP* is the uppercase four-letter park abbreviation, and *ssss* refers to whether the datasheets are originals or the annotated QA/QC copies (i.e., "original" or "qac").

*e.g., ManualAnuranClassifications-2021-TIMU-original.pdf or
ManualAnuranClassifications-2021-TIMU-qac.pdf*

4. Store PDFs in the following folder on the SECN network drive:

S:\Monitoring\Anuran\Data\DataSheetScans\YYYYManualClassifications

where *YYYY* is the sample year.

5. Store paper datasheets in the SECN data storage file cabinet area, in the drawer marked
LANDBIRD AND VOCAL ANURAN MONITORING -- FILE DRAWER #1.

Acknowledgements

The author wishes to thank Wendy Wright (SECN data manager), Brian Gregory (SECN program manager), and Lily Martin (former SECN intern) for reviewing this document and providing helpful comments that improved its content.

Literature Cited

- Byrne, M. W., B. D. Smrekar, and L. M. Elston. 2013. Protocol for monitoring vocal anuran communities in Southeast Coast Network parks. Natural Resource Report NPS/SECN/NRR—2013/720. National Park Service, Fort Collins, Colorado. Available at: <https://irma.nps.gov/DataStore/Reference/Profile/2203687> (last accessed August 2024).
- Byrne, M. W., and B. D. Smrekar. 2012. Vocalization identification quality assurance and quality control procedures. Southeast Coast Network Standard Operating Procedure NPS/SECN/SOP—1.4.21. National Park Service, Athens, Georgia. Available at: <https://irma.nps.gov/DataStore/Reference/Profile/2188726> (last accessed August 2024).
- Byrne, M. W. 2013. Manual evaluation of automated recording device files. Southeast Coast Network Standard Operating Procedure NPS/SECN/SOP—1.4.20. National Park Service, Athens, Georgia. Available at: <https://irma.nps.gov/DataStore/Reference/Profile/2197062> (last accessed August 2024).
- Crother, B. I. (ed.). 2017. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with Comments Regarding Confidence in Our Understanding pp. 1–102. SSAR Herpetological Circular 43.
- Ospina, O. E., L. Tieu, J. J. Apodaca, and E. M. Lemmon. 2020. Hidden Diversity in the Mountain Chorus Frog (*Pseudacris brachyphona*) and the Diagnosis of a New Species of Chorus Frog in the Southeastern United States. *Copeia* 108(4): 778–795, 718.
- Wildlife Acoustics, Inc. 2022. Kaleidoscope User Guide. Available at: https://www.wildlifeacoustics.com/uploads/user-guides/Kaleidoscope-Pro-User-Guide_2022-12-22-143553_fnvg.pdf (last accessed August 2024).

Appendix A. Scientific Names and Alpha Codes

Table A-1. Scientific and standard English names¹ and associated five-letter alpha codes of native anuran species occurring in, or with potential to occur in, SECN parks.

Family	Scientific Name	Common Name	Alpha Code
Bufonidae	<i>Anaxyrus americanus</i>	American toad	ANAME
	<i>A. fowleri</i>	Fowler's toad	ANFOW
	<i>A. quercicus</i>	Oak toad	ANQUE
	<i>A. terrestris</i>	Southern toad	ANTER
Hylidae	<i>Acris spp.</i>	Cricket frog (genus level)	ACSPP
	<i>A. crepitans</i>	N. cricket frog	ACCRE
	<i>A. gryllus</i>	S. cricket frog	ACGRY
	<i>Dryophytes avivoca</i>	Bird-voiced treefrog	DRAVI
	<i>D. chrysoscelis</i>	Cope's gray treefrog	DRCHR
	<i>D. cinerea</i>	Green treefrog	DRCIN
	<i>D. femoralis</i>	Pine woods treefrog	DRFEM
	<i>D. gratiosa</i>	Barking treefrog	DRGRA
	<i>D. squirella</i>	Squirrel treefrog	DRSQU
	<i>Pseudacris brachyphona</i> ²	Mountain chorus frog	PSBRA
	<i>P. brimleyi</i>	Brimley's chorus frog	PSBRI
	<i>P. crucifer</i>	Spring peeper	PSCRU
	<i>P. feriarum</i>	Upland chorus frog	PSFER
	<i>P. nigrita</i>	S. chorus frog	PSNIG
	<i>P. ocularis</i>	Little grass frog	PSOCU
	<i>P. ornata</i>	Ornate chorus frog	PSORN
Microhylidae	<i>Gastrophryne carolinensis</i>	E. narrow-mouthed toad	GACAR
Ranidae	<i>Lithobates capito</i>	Gopher frog	LICAP
	<i>L. catesbeianus</i>	American bullfrog	LICAT
	<i>L. clamitans</i>	Green frog	LICLA
	<i>L. grylio</i>	Pig frog	LIGRY
	<i>L. heckscheri</i>	River frog	LIHEC

Family	Scientific Name	Common Name	Alpha Code
	<i>L. palustris</i>	Pickerel frog	LIPAL
	<i>L. sphenoccephalus</i>	S. leopard frog	LISPH
	<i>L. sylvaticus</i>	Wood frog	LISYL
	<i>L. virgatipes</i>	Carpenter frog	LIVIR
Scaphiropodidae	<i>Scaphiopus holbrookii</i>	Eastern spadefoot	SCHOL

¹ Scientific and standard English names follow Crother (2017). Former taxonomic synonyms: *Bufo* → *Anaxyrus*; *Hyla* → *Dryophytes*; and *Rana* → *Lithobates*.

² *Pseudacris brachyphona* may soon be split into *P. brachyphona* and *P. collinsorum*, Collinses' Mountain Chorus Frog (Ospina et al. 2020). The latter species would be expected within the Southeast Coast Network.

Table A-2. Scientific and standard English names¹ and associated five-letter alpha codes of non-native anuran species occurring or with potential to occur in SECN parks.

Family	Scientific Name	Common Name	Alpha Code
Bufonidae	<i>Rhinella marina</i>	S. American cane toad	RHMAR
Hylidae	<i>Osteopilus septentrionalis</i>	Cuban treefrog	OSSEP
Eleutherodactylidae	<i>Eleutherodactylus planirostris</i>	Greenhouse frog	ELPLA

¹ Scientific and standard English names follow Crother (2017).

Literature Cited

Crother, B. I. (ed.). 2017. Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with Comments Regarding Confidence in Our Understanding pp. 1–102. SSAR Herpetological Circular 43.

Appendix B. Data Sheets

Survey Year		Park Code	Sample Location	Auditory Classification of ARD Anuran Vocal Recordings					
Listener Initials	Date Listened mm/dd/yyyy	File Count	Recordings: Start / End DATES (mmdd)	Recordings: Start / End TIMES default: 20:00 – 04:40	Recording Duration (sec) default: 60	File Format default: WAV	Sample Rate (kHz) default: 32	Channel(s) Reviewed (L = Left; R = Right; B = Both)	
Kaleidoscope Parameters:									
Signal: ☐ (check box if all values are defaults)		Min. – Max. Frequency Range (Hz) default: 0250 – 7,250	Min. – Max. Detection Length (sec) default: 0.5 – 20	Max. Inter-syllable Gap (sec) default: 4	Kaleidoscope Software Version default: 5.5.0				
Cluster Analysis: ☐ (check box if all values are defaults)		Max. Distance from Cluster Center to Include Outputs in cluster.csv default: 1.0	FFT Window Size default: 5.33	Max. States default: 12	Max. Distance to Cluster Center for Building Clusters default: 0.7	Max. Number of Clusters default: 500			
Signal Detections:									
Flag	Species Code	Recording Date (mmdd)	Recording Start Time (hhmm)	Time Offset (sec)	Flag	Species Code	Recording Date (mmdd)	Recording Start Time (hhmm)	Time Offset (sec)
1					8				
2					9				
3					10				
4					11				
5					12				
6					13				
7					14				
If no anuran calls are detected at sample location, indicate in comments and submit sheet as usual. Suggested notations: X Flagged to request later review. Ø (QA) Omit from transcription. ✓ (QA) Reviewed and approved									
No. of Detections: _____ No. of Clusters: _____ Detections Reviewed: _____		General Comments:							
Date _____ Quality Assurance (QA) Accuracy Check		Wildlife Biologist _____ 							
* * USE BLACK INK TO FILL OUT SHEET * *									
Updated: March 2023 RESEARCH DATA			Vocal Anuran Monitoring Project If found, contact: michael_parrish@nps.gov				Datasheet MP-06 NPS / SECN		

Figure B-1. Example data sheet MP-06 (blank). This sheet will be used when classifying anuran vocalization recordings. This data sheet can be obtained on the network drive: S:\Monitoring\Landbirds\Protocol-SOPs\Forms.

2023
Survey Year

TIMU
Park Code

001
Sample Location

Auditory Classification
of ARD Anuran Vocal Recordings

MCP
Listener Initials

07/01/2023
Date Listened
mm/dd/yyyy

1100
File Count

0310-0615
Recordings:
Start / End DATES
(mmdd)

20:00 - 04:40
Recordings:
Start / End TIMES
default: 20:00 - 04:40

60
Recording Duration
(sec) default: 60

WAV
File Format
default: WAV

32
Sample Rate
(kHz) default: 32

L
Channel(s) Reviewed
(L = Left; R = Right; B = Both)

Kaleidoscope Parameters:

Signal:

☒ (check box if all values are defaults)

Min. – Max. Frequency Range
(Hz)

 default: 0250 – 7,250

Min. – Max. Detection Length
(sec)

 default: 0.5 - 20

Max. Inter-syllable Gap
(sec)

 default: 4

Kaleidoscope Software Version

 default: 5.5.0

Cluster Analysis:

☒ (check box if all values are defaults)

Max. Distance from Cluster Center to Include Outputs in cluster.csv

 default: 1.0

FFT Window Size

 default: 5.33

Max. States

 default: 12

Max. Distance to Cluster Center for Building Clusters

 default: 0.7

Max. Number of Clusters

 default: 500

Signal Detections:

Flag	Species Code	Recording Date (mmdd)	Recording Start Time (hhmm)	Time Offset (sec)	Flag	Species Code	Recording Date (mmdd)	Recording Start Time (hhmm)	Time Offset (sec)
1	ACGRY	0407	0000	15	8				
2	GACAR	0510	0220	00	9				
3	OSSEP	0315	0320	44	10				
4	DRCIN	0315	0300	10	11				
5					12				
6					13				
7					14				

If no anuran calls are detected at sample location, indicate in comments and submit sheet as usual.
 Suggested notations: X Flagged to request later review. Ø (QA) Omit from transcription. ✓ (QA) Reviewed and approved

No. of Detections: 1145
 No. of Clusters: 32
 Detections Reviewed: 160

General Comments:

Date: _____
Quality Assurance (QA) Accuracy Check

Wildlife Biologist: _____

** USE BLACK INK TO FILL OUT SHEET **

Updated: March 2023
RESEARCH DATA

Vocal Anuran Monitoring Project
 If found, contact: michael_parrish@nps.gov

Datasheet MP-06
NPS / SECN

Figure B-2. Example data sheet MP-06 (with sample data entered). Data were entered directly (as values) and by checking a box to indicate default values were used. This data sheet can be obtained on the network drive: S:\Monitoring\Landbirds\Protocol-SOPs\Forms.