Producing stems for band rehearsals

1. The use case

The typical use case would be for an amateur rock band which loves to perform covers of its favorites songs. Whenever a band member misses the rehearsal (i.e. drummer or singer), the whole session is compromised and many times it turns out in a cancellation. Using the original, raw song as a backing track on an MP3 player is not usually a good workaround, since lots of other instruments are also introduced, not only the missing ones.

The panorama has changed with a new breed of AI software which does a decent job at separating a typical song into 4-5 stems, usually drums, bass, vocals and other. Then, we just have to solo the drums/vocals track if the drummer/vocalist is missing. The one that I use (Moises) even provides a click track with a stream of pulses and a mobile application where you can solo/mute the needed tracks. And that alone solves 90% of the band rehearsals needs, so if you're fine with this, then no need to read on.

But, what if you want to go the extra mile and would like to provide:

- a decent click track, with count-in and accented downbeats.
- a voiceover track with the song's parts for a case where you are using only a click track as the backing track.

This needs further editing in a DAW. The workflow described here could be adapted to almost any other DAW. However, for this tutorial, we will use Waveforms 12 Pro. The Pro version contains a couple of key tools for this workflow:

- Groove Doctor which makes it very easy to produce tempo maps from transients.
- Remove silence, splitting a clip into many with silences removed in between.

The rest of the document describes the workflow I use to produce backing tracks with this additional material. To ease tedious work in some tasks, I have developed a series of Waveform Macros, which can be downloaded.

2. Pre-requisites

- Stems already separated with Moises
- Click track generated with Moises. The premium version includes the whole click track. Free versions only render the first minute.
- Waveforms 12 Pro or Waveforms 12 Free with Recording Engineer Expansion (needs Groove Doctor and Strip Silence)
- Custom Macros installed:
  - Duplicate selected range in clip
  - Insert padding for selected tracks
  - Pick every 4th transient in clip
  - Pick every 3rd transient in clip
  - Pick every 2nd transient in clip
- Some short samples with “Intro”, “Verse”, “Chorus”, “Bridge”, etc. for the voiceover track.

3. Procedure

The whole procedure contains 6 tasks, each one of them trying to solve a particular problem:

- Project preparation.
- Inserting a count-in bar.
- Extracting the downbeats.
- Producing the tempo map.
- Adding a voiceover.
- Exporting the final stems.

3.1. Project preparation

The goal of this task is to prepare the project with the different tracks for further manipulation in Waveforms 12. I use a template that has all the screen layout and a set of labeled tracks for a typical rock song with 5 stems (Click Track, Drums, Bass, Voice and Guitars). A step by step guide to import external audio files in Waveforms is an easy but out of scope task for this tutorial. After importing all the tracks, the project would look like in figure 1:

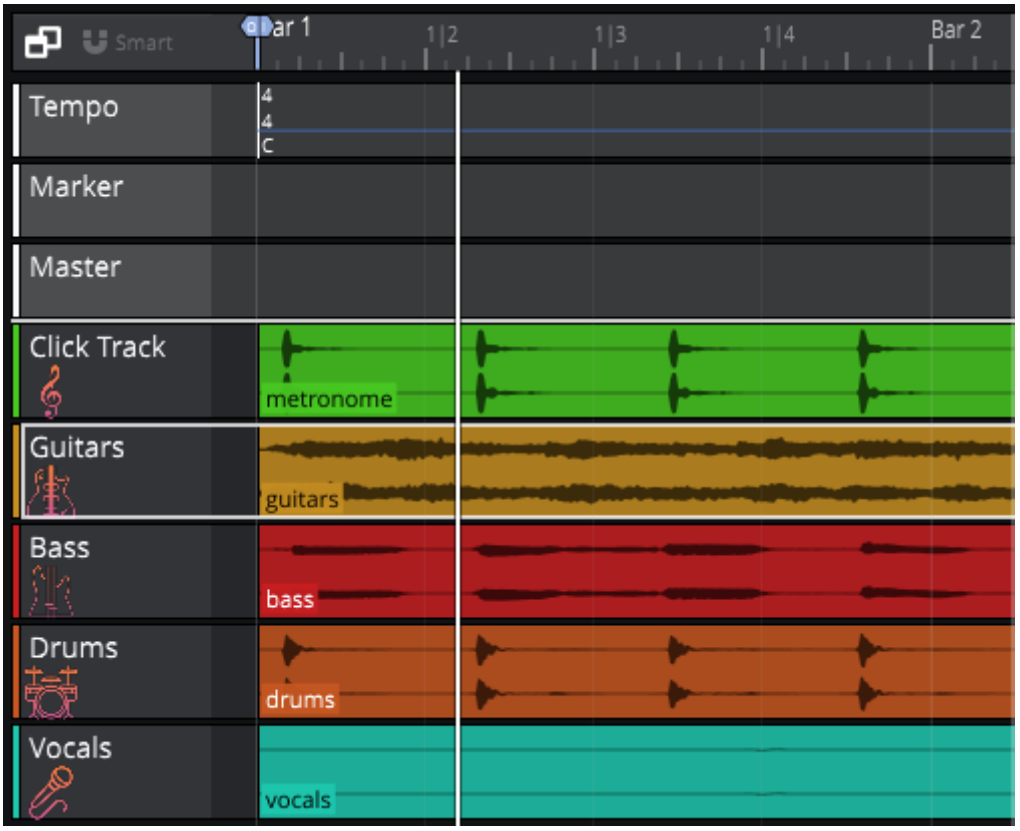

Figure 1: Project just after the stems import. Note that the guitars' part has a leading slow attack before the first click in the click track.

As we can see in figure 1, there is a tiny leading silence in the click track that we would like to get rid of. However, there is a slow attack on the guitar track that should not be ignored. We'll deal with it in the next task.

Note that the Tempo Grid is completely misaligned with the click track. Even with the leading silence trimmed off, and an estimation of the global tempo, the natural click-stream will slowly drift from the regular grid pattern. Being able to produce an adaptive tempo map is a good thing for a DAW in these circumstances and we will take advantage of it.

3.2. Inserting a count-in bar

The goal of this task is - as we stated in our use case - to have a count-in bar before the song actually starts. Its tempo will be the same as the first bar in the song. This is the task we will address first and it is a long one.

There may be some variations on how to do it depending on leading upbeats or time signature. We will assume a typical 4/4 case with no upbeats, as shown in figure 1.

It is also important to note that the count-in bar should not have no a leading silence. Otherwise the tempo map extraction tool will not produce a good map for the count-in bar. We will take care of this in this task too.

Steps

- Range select the first 4 clicks in the Click Track. Then select the clip in the click track (called metronome). The selection borders can be adjusted very precisely using the Zoom tool. The Edit Screen should look like figure 2.

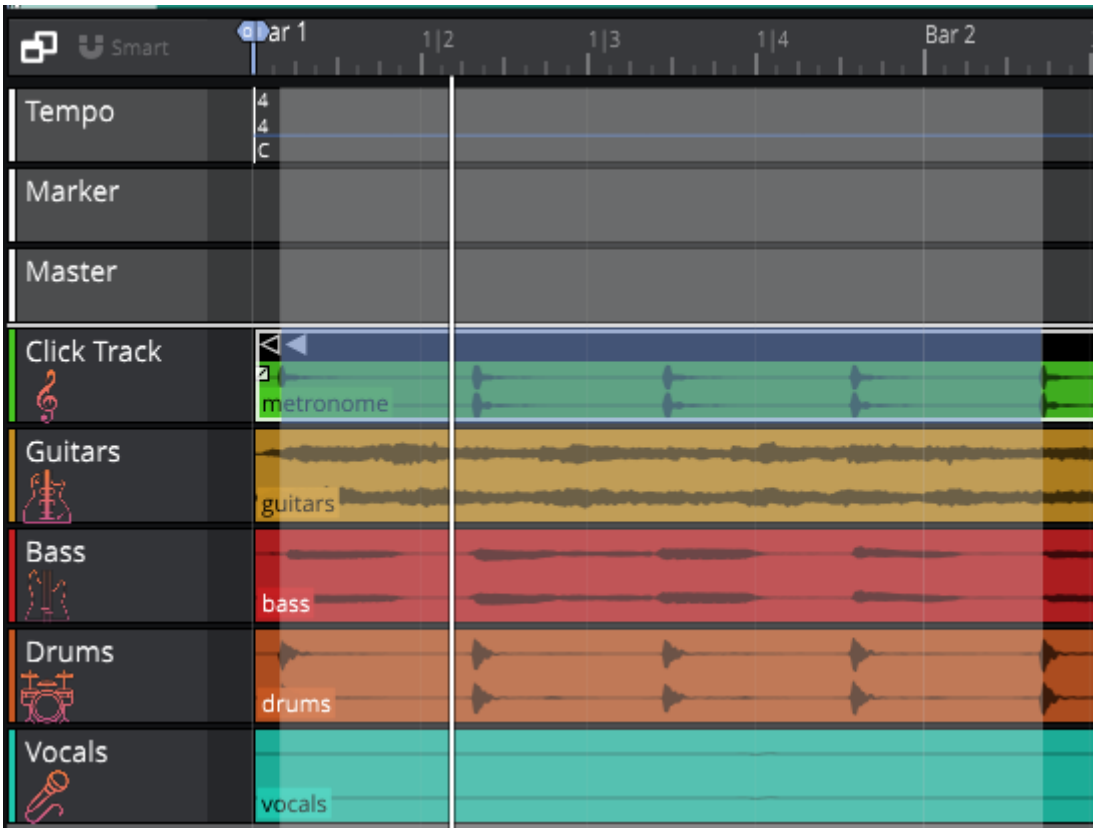

Figure 2. Range selection over a span of 4 clicks with the rests included. Note that the "metronome" clip has been selected.

- Execute the Macro "Duplicate selected range in clip" (see figure 3). Note how a new duplicated clip has been created from the former range selection and it has been inserted before the selection. All other tracks have been affected too and a blank space has been inserted.

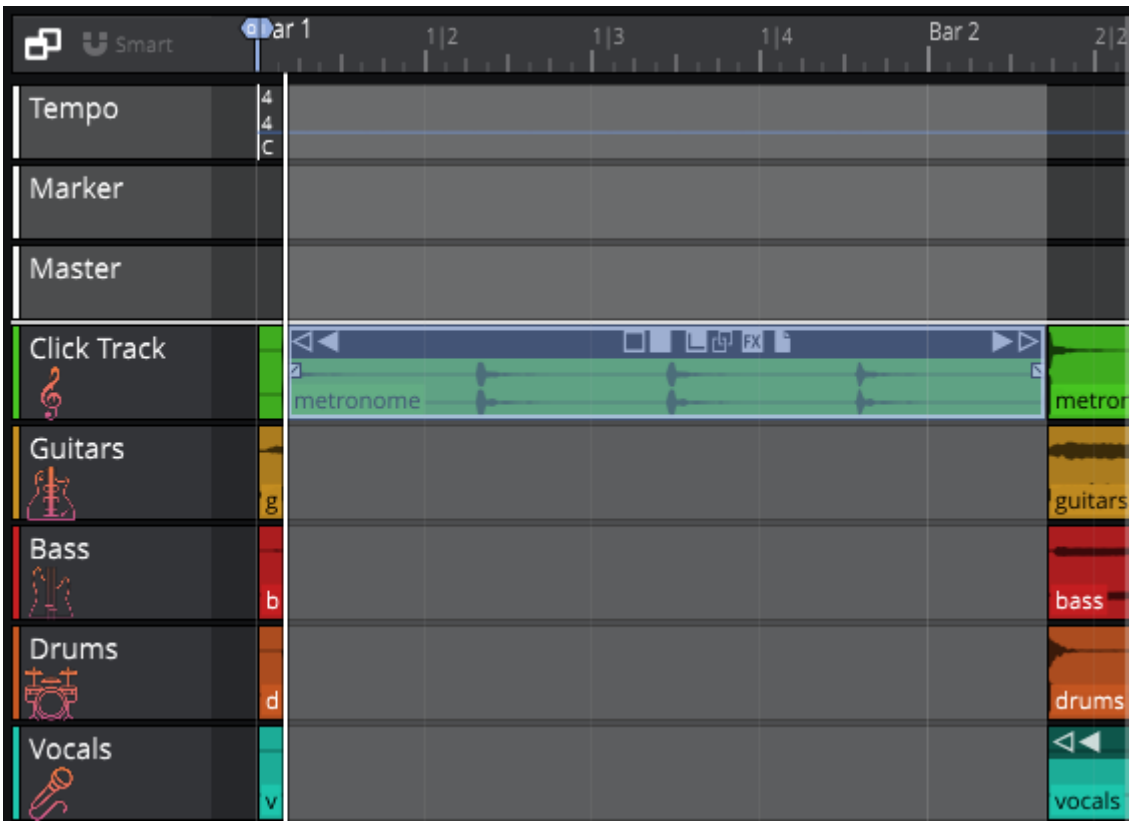

Figure 3: After “Duplicate selected range in clip”. Note the leading tiny clips on the left side which we will delete at some point.

Figure 4: Macro execution “Duplicate selected range in clip” has created 4 clips. From left to right we can see a leading space, 2 duplicated clips and the remaining clip in the track.

- If we examine figure 3, we see that the guitars’ attack has been splitted. Now it’s time to account for this by duplicating this clip [D] and adjusting next to the rest, using Snap [Q] with the “Snap clip to other clips”. The resulting edit should look like figure 5.

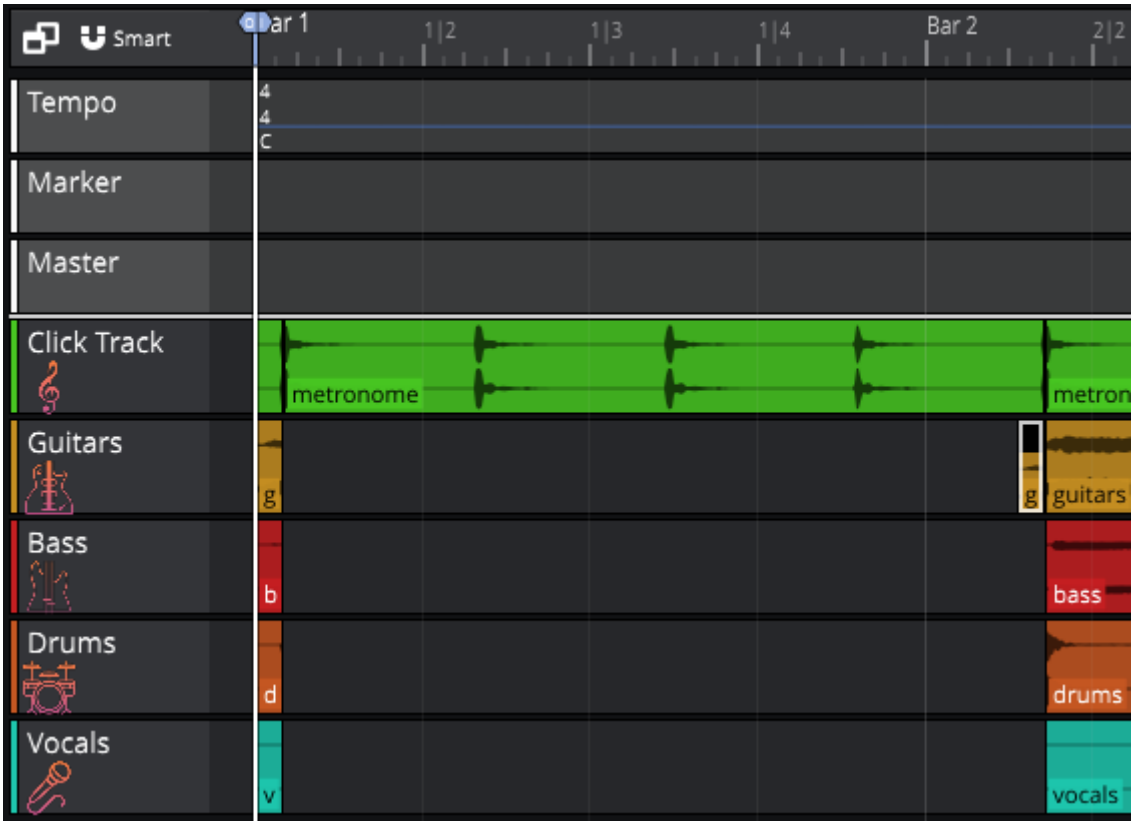

Figure 5. After duplicating and snapping the leading guitars' attack with the rest of the audio.

- Now we can delete the leading silence, by selecting first all the leading clips (5 in this case) and using the "Ripple delete" tool [<CTRL> <BKSP>]. Figure 6 shows that the Click track now starts with a click, all silences have been removed and the following clips have been shifted to account for the lost space.

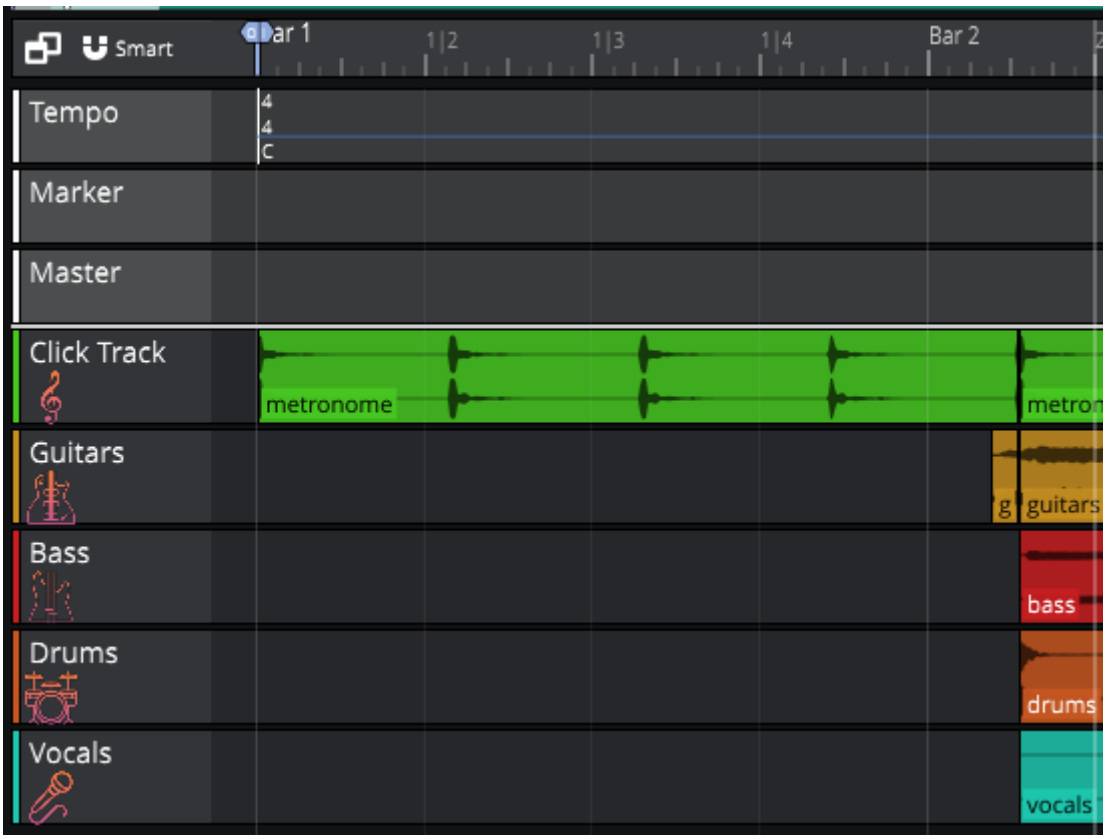

Figure 6: Left. Selecting the leading clips for removal. Right after ripple deleting the selected clips.

- Now we will fill the leading blank spaces with padding for the following tracks: Click Track, Guitars, Bass, Drums and Vocals. This can be done manually but a custom Macro will do it automatically. So select these tracks (not the clips!) and execute the macro Insert padding for selected tracks. The macro execution also merges clips, so we will take advantage of it to merge the remaining 3 clips in the Click Track. Now, every track has a single clip again. The result is shown in figure 7.

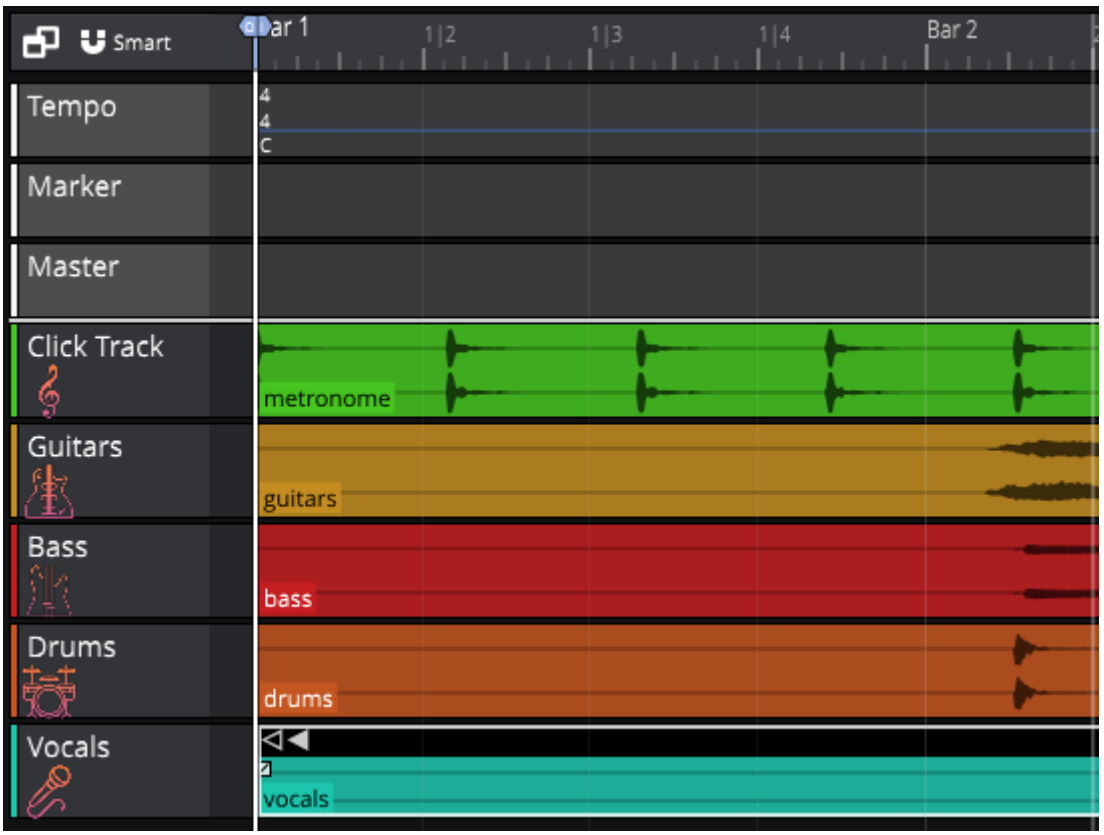

Figure 7: Blank spaces have been filled with padding. Also the various clips in the Click Track and Guitars Track have been merged track by track.

By playing the song, we can check that the leading bar stays in sync with the rest of the clicks and none of the leading attack material has been lost.

3.3. Extracting the downbeats

Tempo maps can be easily produced with tracks that also have downbeats, so the goal of this task is to replace the original click track with another one that only contains the downbeats. Since this is a typical 4/4 song with no tempo signature variations, we will pick every 4th click in the track. This can be done manually (tedious and prone to error) or automatically using a macro.

Steps

- Select the “metronome” clip in the Click Track and execute the macro Pick every 4th transient in clip. The Macro will remove silences between clips, select one clip very 4th and render another “downbeats” clip. The result can be shown in Figure 8.

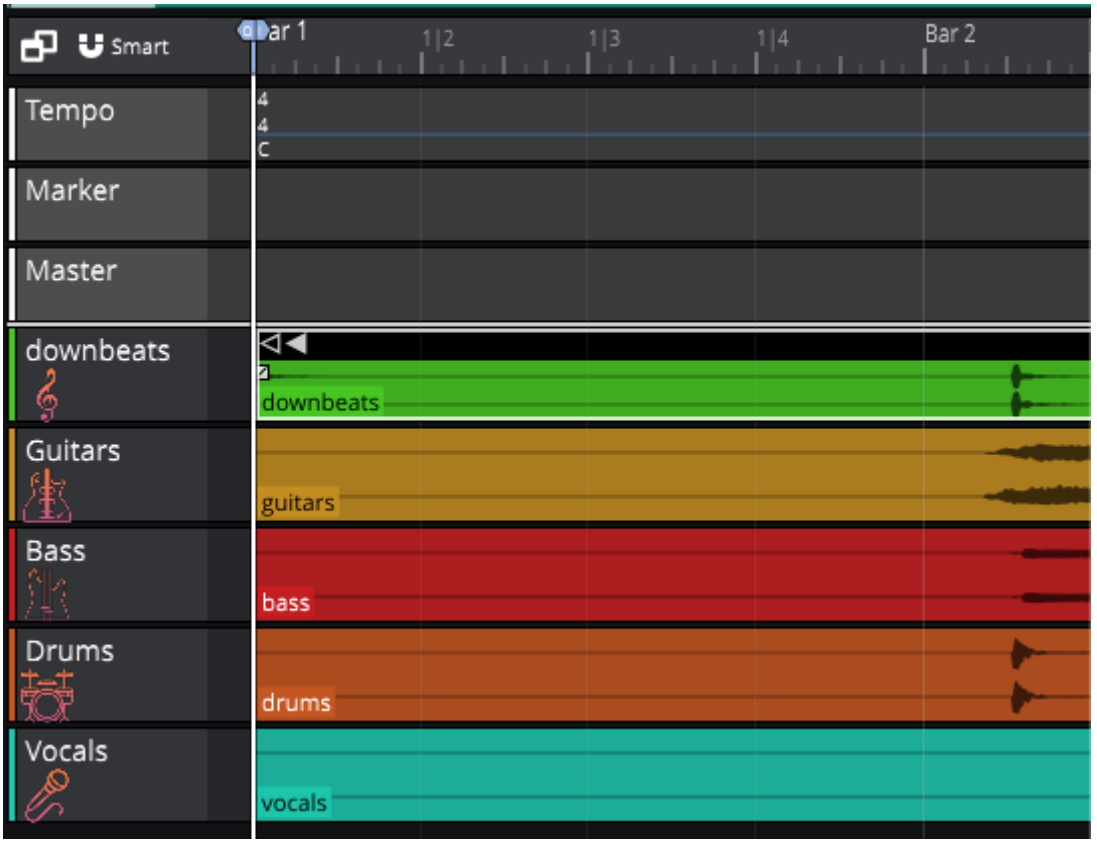

Figure 8: After clip decimation. Note that the first clip on the left is still there, but the 2nd, 3rd and 4th are not. Note that the Tempo Map (the gray bars) are not aligned with the down beats.

3.4. Producing the Tempo map

Now we are ready to produce a tempo map with a specialized tool, in this case “Groove Doctor”. There is an excellent tutorial on this: [Tracktion Waveform 11 Pro: Tempo Mapping with Groove Doctor]. We will follow it, skipping details.

The goal of this task is twofold:

1. To align Waveform’s tempo map with the song.
2. To produce a rendered audio file containing a new click track with emphasized downbeats and a lead-in count in.

Steps

- Call Groove Doctor. After following the video tutorial and apply Groove Doctor’s Tempo map tool, our tempo map will be finally aligned with the downbeats (see figure 9). We can verify it by silencing the “downbeats” track and enabling Waveform’s built-in metronome with the “Emphasize downbeats” option on. Now that the Tempo Grid is aligned with the song, we no longer need the “downbeats” track and we can mute or delete it (I opted for the second option).

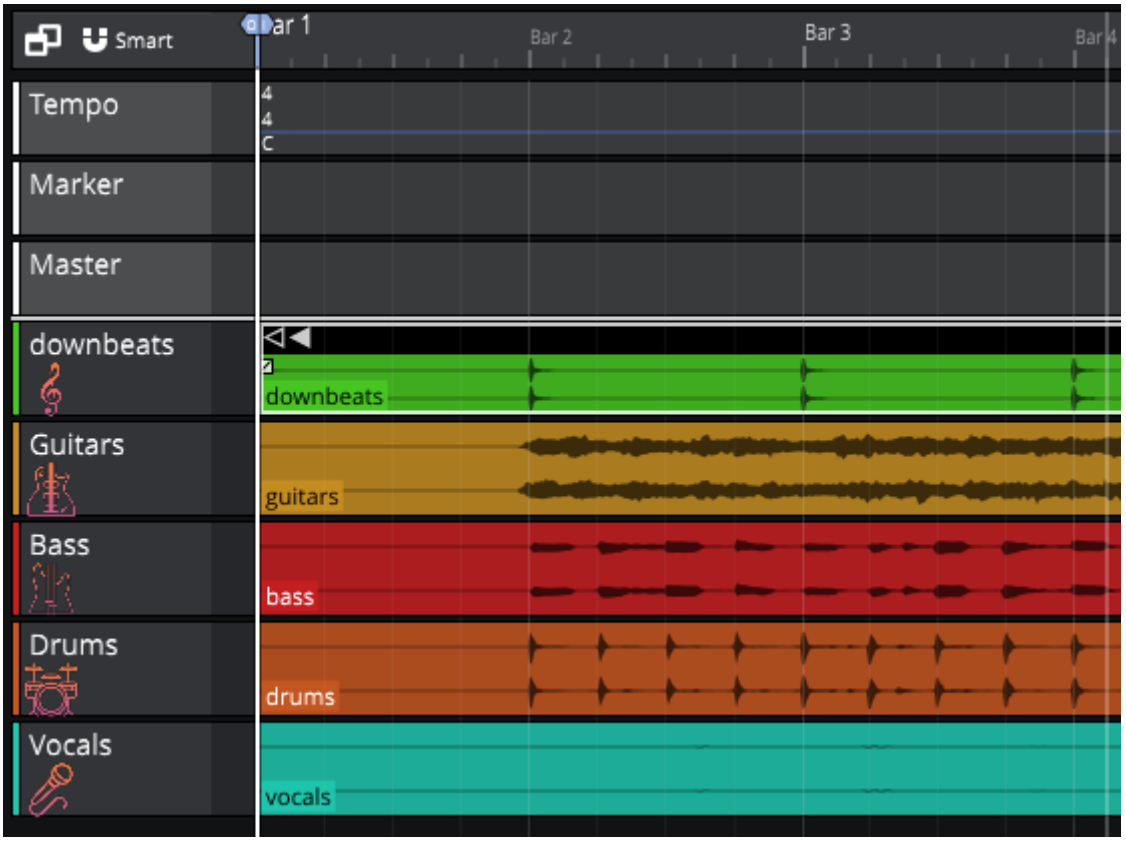

Figure 9: After Groove Doctor's tempo map execution. Note how the Tempo grid is aligned with the downbeats.

- Insert a virtual drum kit to produce sounds every beat and accented downbeats (see figure 10). This is based on the excellent tutorial [Tracktion Waveform 11 Make Your Own Click Track, Track Preset] The tutorial uses Waveform's "Micro Drum Sampler" and explains how to do your own "metronome kit". I produced mine using my own sounds, but Waveform 12 comes with this kit already built-in. After having checked that the virtual instrument generates a click track aligned with the song, it is time to render this track into a separate audio file so that we can distribute it along the rest of the stems.

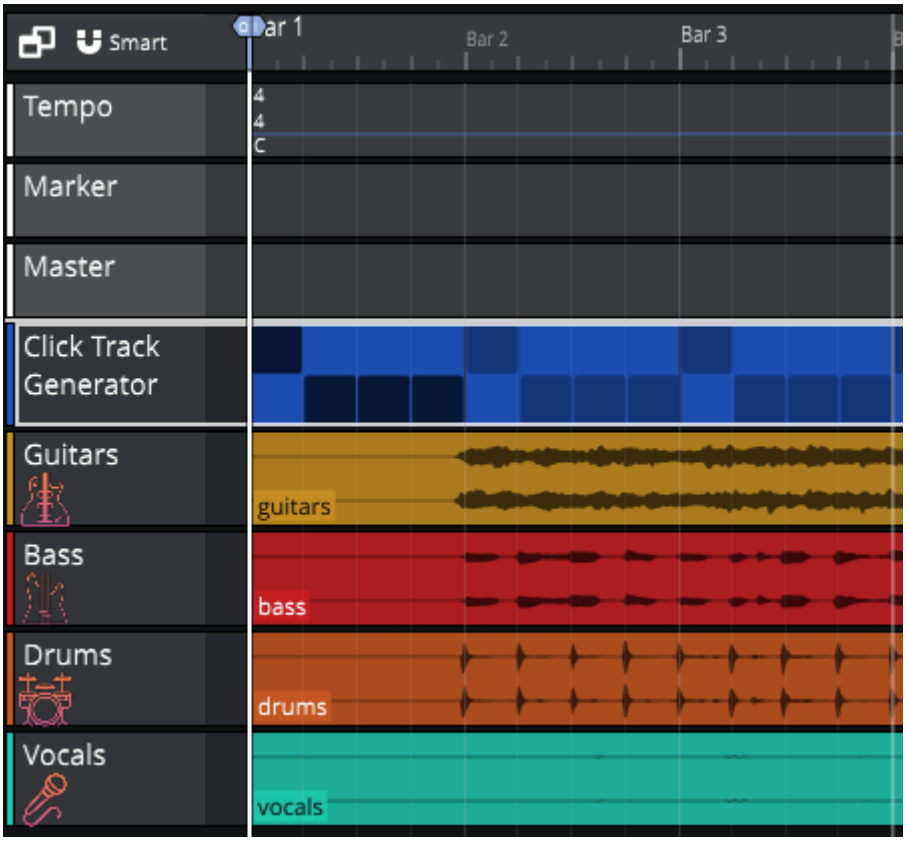

Figure 10: Replaced the downbeats Track with a “Click Generator Track” using a Step generator clip and “Micro Drums Sampler” virtual instrument.

- Create a new Track after the Click Track Generator by selecting it and pressing [T]. Select the Click Track Generator clip and in the properties, click on the Render File option (see figure 11). Render the selected clip to a Track next to it.

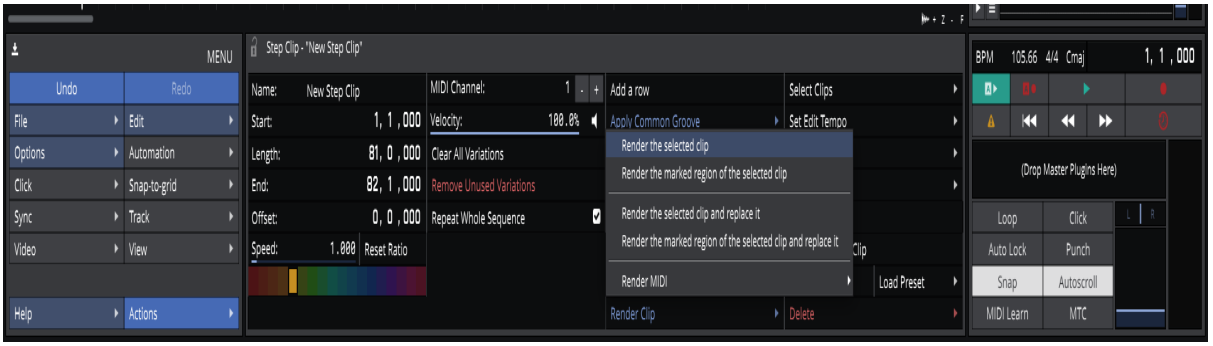

Figure 11: Rendering the Click Track Generator clip into an audio file. make sure to select Render to Track Next to it in the upcoming dialog window.

- Now that we have rendered the audio file, check everything is aligned as it should be and we can delete or mute the virtual instrument track. The result is shown in figure 12.

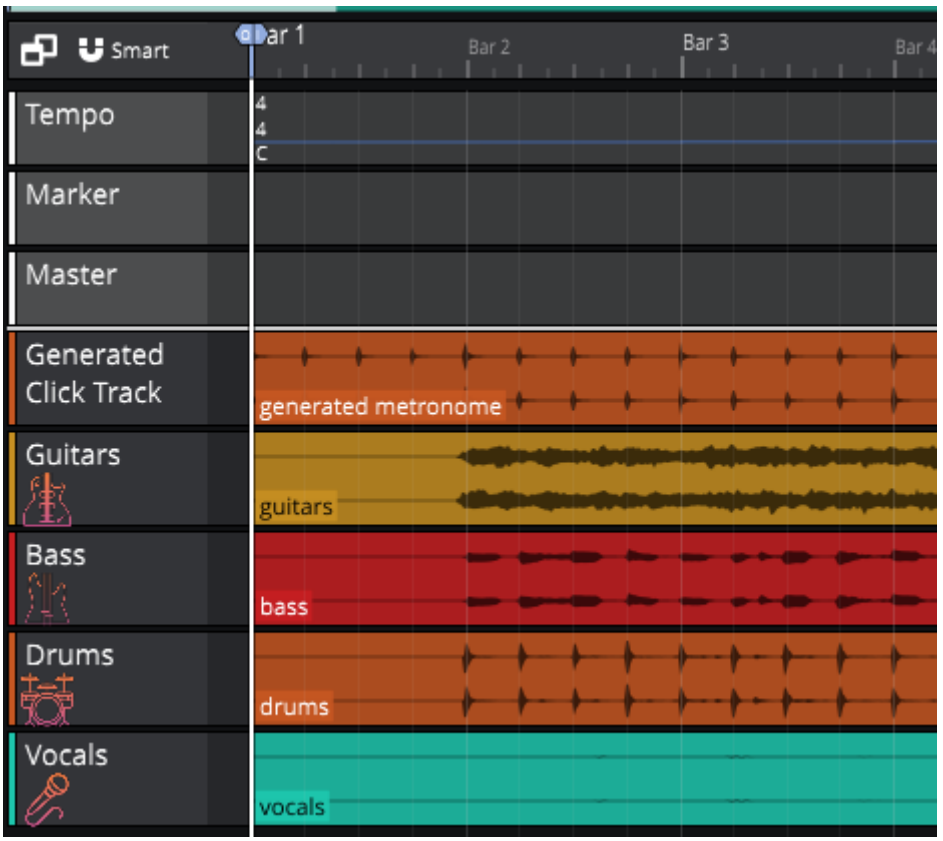

Figure 12. New click track audio clip with count-in and accented downbeats, aligned with Waveform's tempo map. Note we have deleted the "Click Track Generator" track, since we don't need it.

3.5. Adding a voiceover

The goal of this task is to produce a new voiceover track with the clips "Intro", "Chorus", "Verse", etc. This is mostly useful when your band wants to do a rehearsal with no backing tracks other than the click track.

Steps

- Use the marker tracks to organize the song into sections. Usage of markers in Waveform is outside the scope of this document and is explained in the following tutorial: Waveform 11 Free: Locator Markers, Marker Track, and Marker Clips
- Add a new Voiceover Track [T] on top of the click track, drag your voiceover loops on to the edit and align them with your song sections. make sure that this is where you want them to be.
- Select all clips in the track and merge them into a single clip. The result can be seen on figure 13.

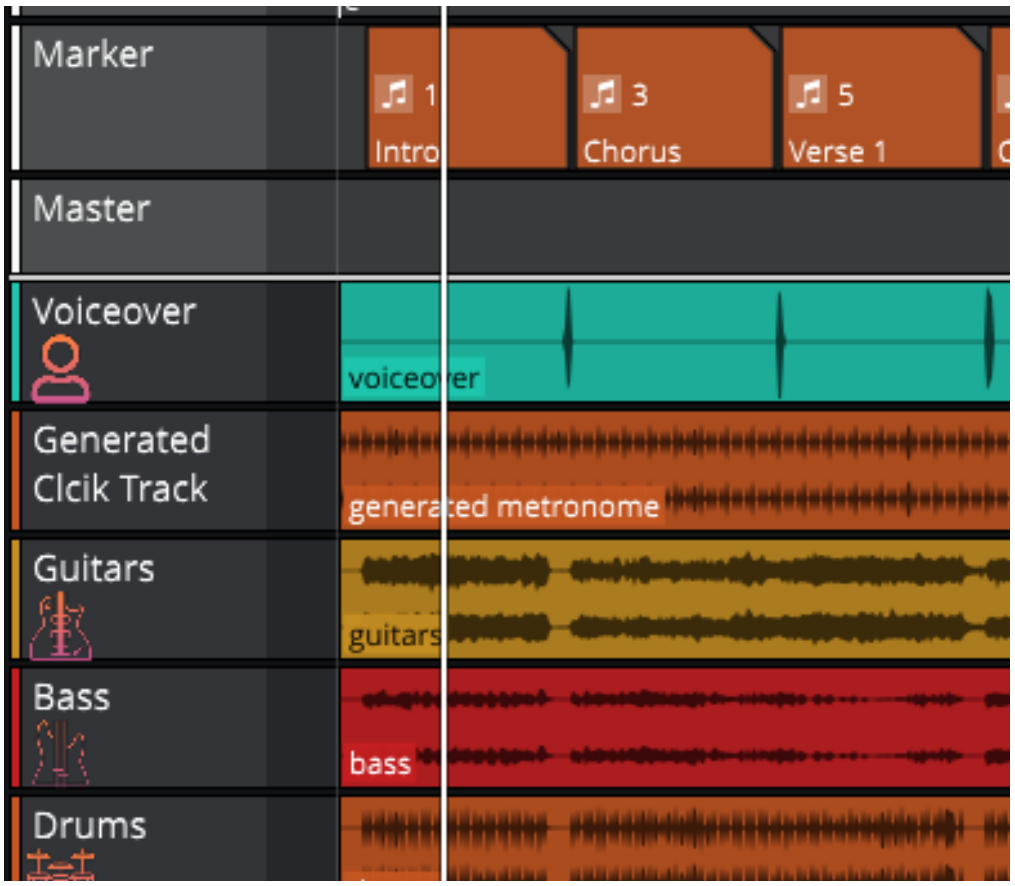

Figure 13. After song markers and voiceover tracks have been added.

3.6. Exporting the final stems

The goal of this last task is to produce the stems of this rehearsal material so they can be reproduced by another portable multitrack player (i.e. Audio Elements mobile app). This task is not necessary if using a laptop with Waverform in the rehearsal room.

Steps

- Select the tracks you want to export. If we didn't delete temporary click tracks, you want to export only the tracks that you need (Voiceover, Generated Click Track, Bass Drums, Vocals).
- select File > Export Render to a file … A Dialog window opens where you select the export file format (MP3, WAV, etc). make sure you click on the “Render Each Track to a Separate File” and “Only Render the Selected Tracks”.

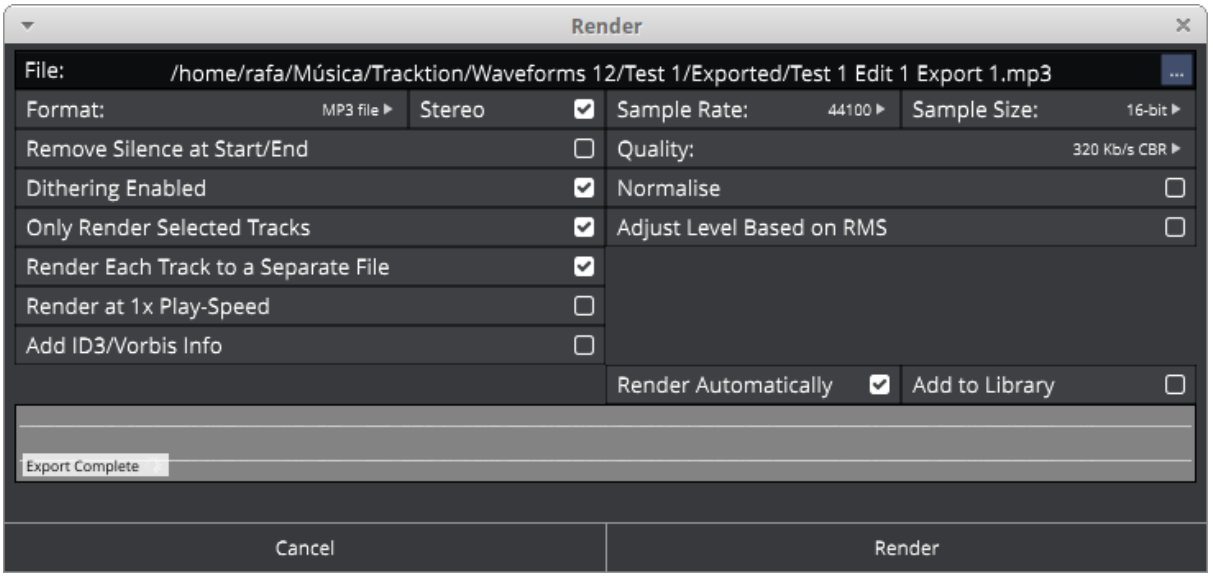

Figure 14: Options needed to export multiple stems