Extend phone battery life while navigating off track with Oruxmaps

Any app will use battery power while it uses the screen, checks GPS location, navigates a route or records a track. This does not matter much when using power from a car, but it can be a big problem off track. OM only checks location services when you turn GPS on. If any navigation or track-recording is on, OM continues to use GPS (and battery) in the background and even when the app is turned off. Then you will have to "Stop GPS" in OM (which you can open from the notification). You need GPS on to track or help with navigation, of course, but happily there are ways to maximize phone battery life while tracking. (Most things can be done several ways in OM; I have used the classic menu system where possible in the examples below. Ver 7.4.28 - 12.0.5 are similar except where indicated)

It is best to check OM run time, and any method to improve it, in a specific device before use. Functions including "location services" can vary between Android versions and devices, so apps like OM may not work "as advertised" in every host device (*eg* background track recording may either fail or reduce power use with altered battery settings). Some OM versions give more trouble. Assuming (i) disabled battery-saver; and (ii) no permission removal for OM (*Phone settings >Apps > OM... > Battery; Manage app)*:

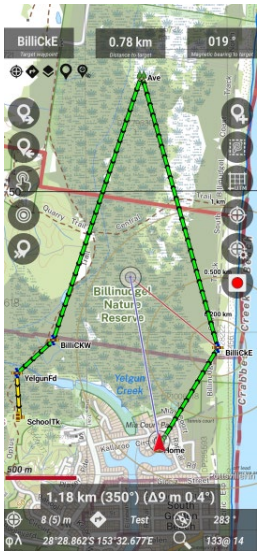
1. Install and use as few apps as possible. Do not install any apps that try to trick the OS into background behaviour like keeping GPS on, killing apps, or cleaning the RAM.
2. Use offline maps. You can cache WMTS tiles, or build offline OM maps from WMTS in areas of interest.
3. Some OM options are heavy CPU (power) users. Turn off options that are not needed, especially those that use the screen. Turn off things like 3D map view and altitude graphics, however you turned them on (*eg* Button bar, or Settings > User Interface > ...).
4. Remove unnecessary overlays (Maps > Overlay options). Hillshades (shadows), contour lines (only shown in OSM maps), grid, *etc* all use more power and cause more screen redraws. You can save a minimal set-up as a "profile" if you like (Top Menu ⋮ > Profiles > + > Current; Profile name *eg Battery-save*, and confirm that all settings are indeed saved). Be careful if experimenting, as OM will save current settings to the saved version of your active profile. Strange things may happen if you delete the saved version of the active profile. OM profiles also sometimes get corrupted, so make back-ups.
5. At the trailhead:
   - Start OM, and get a GPX fix (*eg* Tracks > Start GPS). If GPS cursor is "Circle", map should centre on a blinking [at GPS rate] red-white-green cursor ⌖ ⌖. After a delay, dashboard "GPS accuracy" will show x m estimate & # satellites in use. Red -- (--) means no fix. I am unsure about x (0) - probably ignore # with lowered GPS rates. TTS settings can alarm on GPS fix and signal loss for 4 x Minimum time (they match presence of an accuracy estimate). The accuracy estimate (from Android or device algorithms) is much better than reality unless many satellites are in view. Few current phones support dual-frequency GNSS or SBAS (in Australia), reported to vastly improve (30 cm) accuracy.
   - Check your position, in the map you intend to use. If the GPS cursor is not where you expect to be something is wrong: you may be in the wrong spot, or there may be an error in the map or app. OM should get the correct datum from map metadata. Maps >Map tweaks >Map calibrator may allow a temporary solution, but it is safer to abort reliance on the digital map until you sort it out. For safety, always carry a printed map and compass, and know how to use them.
   - If you have a battery-save profile, "Load" it now. Also load any waypoints and tracks that you need, preferably as overlays (*eg:* Waypoints > Manage waypoints > *Select folder* > *Select desired waypoints* > Bottom menu ≡ > Load as overlay; or use pre-saved overlays: Maps > Manage overlays > + > yes > *Select one or more*). Choose the map you want (Maps > Switch offline map here > *Select one*).
   - Put the phone into airplane mode if you do not need calls. "Tower-hunting" is a huge battery user, especially in areas with weak or gappy phone coverage.
   - Set phone "Location services" to GPS only (even if Android labels this as low accuracy or high battery use). Sometimes this is buried deep in Android menus, under a name like "Location Accuracy" (there turn off "Improve Location Accuracy" and any extras like "Wi-Fi / Bluetooth scanning"). It will vary by phone model. OM (NG) demands the "precise location" permission, even when "Location Accuracy" is off.
   - Go back to the phone home screen, then turn off that screen (sleep the phone). GPS chip use will cease unless navigation or track-recording is on. You can also "Stop GPS" first to be sure.
   - In cold weather, keep the phone somewhere warm.
6. Use the screen as little as possible: it is the biggest power user in a mobile phone. (Screen illumination uses roughly 10 times more than the GPS chip in modern smartphones.) Use of a dark theme may help, as may auto-brightness mode in dim conditions.

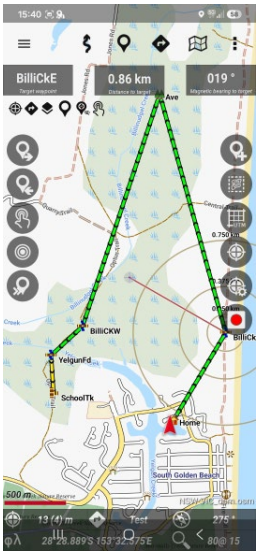
7. Turn on the phone screen and bring OM to the foreground only when you need to check the map. Remember to go back to the home screen and sleep the phone, or OsmAnd may keep the screen on.

8. If you want to record a track, use Tracks > Start Recording. But also set Tracks > GPS settings > GPS settings > Minimum time (30 sec) > Minimum distance (5 m) > Accuracy for position fix (20 m); or use Tracks > GPS mode > Power save (30 sec. 80 mts.). (Google / Android can intervene, so this may not affect GPS chip battery use. There is irregular loss of satellite reception in "GPS accuracy", indicating probable GNSS chip duty cycling). Other consequences of lengthened GPS "Minimum time": (i) wait longer for any new location fix; (ii) increase "Waypoint distance" (Top Menu > Global Settings > Waypoints > ...), or you may miss passing a waypoint between GPS updates. The OM status bar at top left should now show a grey GPS symbol (plus a coloured GPS symbol if Fast or Power-save GPS mode has been selected) along with a squiggle and ⏺ for track logging. Pause recording while stopped for long breaks (*eg* Tracks > Stop recording. When you resume track recording, you will be offered to continue the track, start a new segment, or start a new track. There is an also an OM setting for maximum stored points per track.) Turn the screen off to achieve about 20 h run time from a full charge (maybe more in power-save GPS mode).

9. If you want OsmAnd to navigate, turn off the voice-prompts to save battery (Top Menu > Global settings > Text to Speech > Waypoint alarms *off*; Route alarms *off*). Off the beaten track, you will probably use direct navigation between route points. OM can use either a route imported as a GPX or KML file (Routes > Track/route tools > Load KML/GPX file > *Select one* > Waypoint navigation [no alarm]> Start GPS > ACCEPT), or a saved route (Routes > Manage > *Select one* > Follow > Waypoint navigation [no alarm]> Start GPS > ACCEPT). If you have the GPX/KML file in OM (tracklogs folder) there is no advantage in also saving it as an OM route (which goes into the OM database and creates probably duplicated waypoints). In OM 7.4.28, "Waypoint navigation" navigates GPX <wpt> not <rtept> (sometimes called KML 'via points' or distinguished as 'shaping points'), with next/previous wpt in route sequence (OK if routes are made from wpts). In OM NG 12.0.5, this has changed to GPX <wpt> order which is usually alphabetical (useless, stick with 7.4.28 until this is fixed). The status bar will show ◆ for a loaded route and 📍 for waypoint navigation (go figure). To reduce redraws, turn off the screen (or use Maps > Map Tweaks > Disable GPS Map Scrolling. Then use Map > Center map > *where you want*. Top Menu > Lock display avoids accidental gestures in OM). Your GPS setting for "Minimum time" also applies during navigation, so there is a trade-off between battery life and accuracy or fix time. Expect less than 10 h run time from a full charge (more time with less screen and GPS use).

Rather than using OM for continuous navigation, you can just get bearings when you need them: (Routes > Manage > *Select one* > Follow > No navigation > No GPS > ACCEPT). When you need to check, turn on GPS (probably in Fast mode), click on (*select*) your next route point to get a pop-up box, then click SELECT AN ACTION > Open 'navigate to' tool > Direct to > ACCEPT. If you have used Top Menu > Global settings > User interface > Dashboard > Top Dashboard (Left - Target waypoint, Center - Distance to target, Right - Magnetic bearing to target), these things will appear on screen. When you are ready you will need to: Stop GPS if not track recording, Stop waypoint navigation (these things can be in your button bars) and turn off the screen. This should give the longest possible 'run' time.





Caution: Check all this and be familiar with it before departure. Don't sit on your phone (it is less robust than a dedicated GPSr) or try to use it in the rain (most touchscreens won't work when wet)!

A GPS track can be a great way to review a hike, but you may find that you enjoy the hike more, and develop other navigation skills faster, with less screen and GPS use. On a multi-day trip you may still need a solar charger and/or powerbank.

It may help to run GPSTest occasionally while you have a data connection, and "Inject" both time and PSDS data. This should update the GPS almanac, speed up GPS fixes, and improve their accuracy. Repeat after about a week, or position changes of more than 500 km. GPS assist data can be obtained slowly from the GPS satellites themselves, if there is a sufficient period with a good view of the sky.