Know your zone: geo-query of provisional seed zones

Andy Bower[1] Charlie Schrader-Patton[2] Vicky Erickson[3] Nancy Grulke[4]

The Right Seed in the Right Place at the Right Time:
Tools for Sustainable Restoration

Figure 1. For successful grassland restoration, know the zone of your plant material.

Seed Zone = An area within which plant materials can be transferred with little risk of being poorly adapted to their new locations.

Acquiring native seed that is adapted to a restoration site is critical for rangeland/grassland revegetation success. Bower et al 2014 have mapped *seed zones* that define these areas of adaptation – provisional seed zones. But collectors in the field typically have no way to identify the seed zone of their current location, so to address this problem we developed mobile android applications that locate the collector's position and display the seed zone.
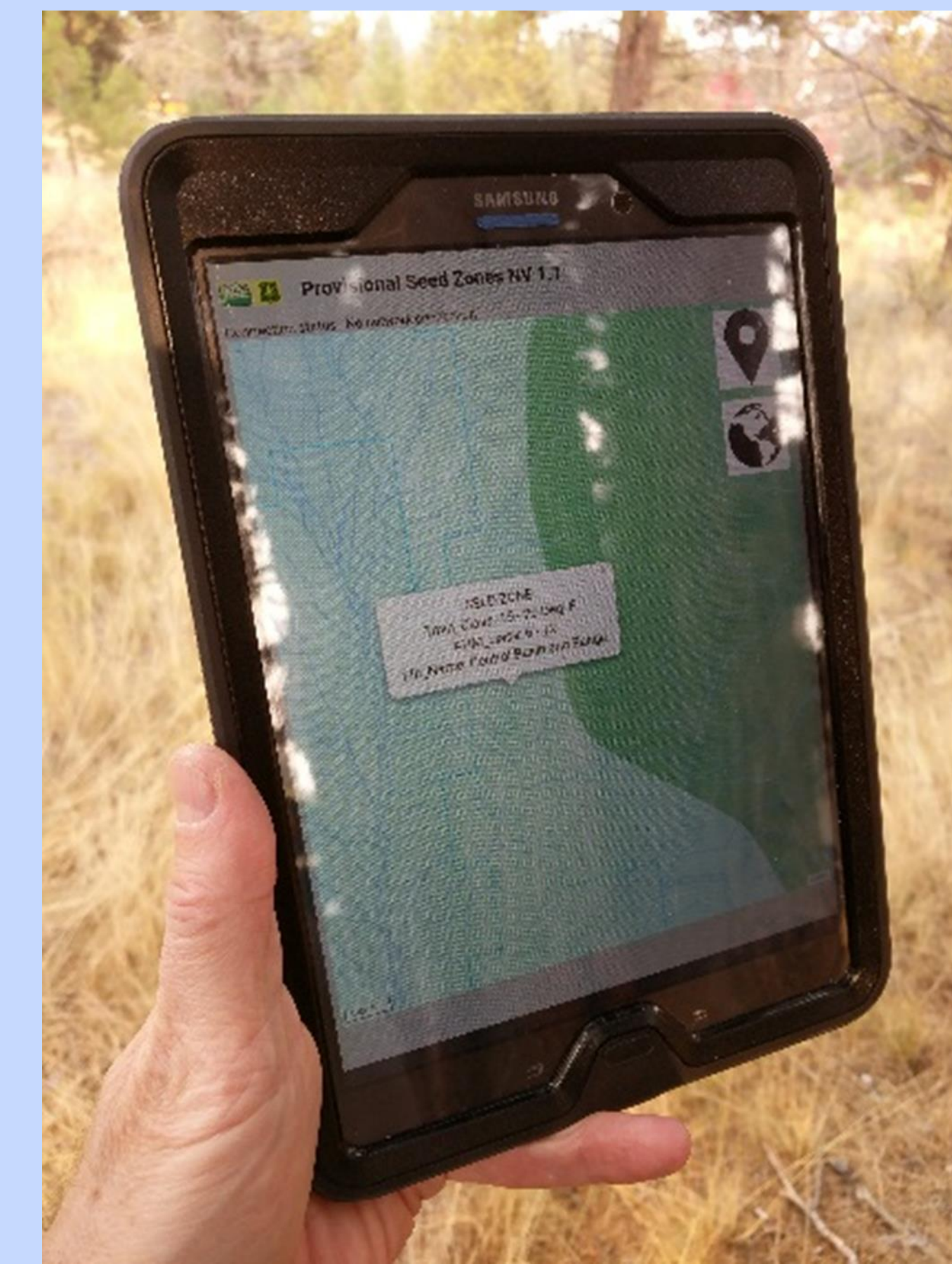
Provisional Seed Zones

For many common grassland and rangeland restoration plant species, seed zones have been developed using common garden studies – cultivating plants from different locales under uniform environmental conditions and observing traits to separate populations. But for many important restoration species these studies have yet to be conducted. For these species *provisional seed zones* have been mapped for the coterminous US (Bower et al 2014). In simple terms, these are areas of uniform minimum average temperature and aridity. Used in conjunction with Omernik's level 3 ecoregions provides a ecological classification that can inform many rangeland/grassland management decisions.
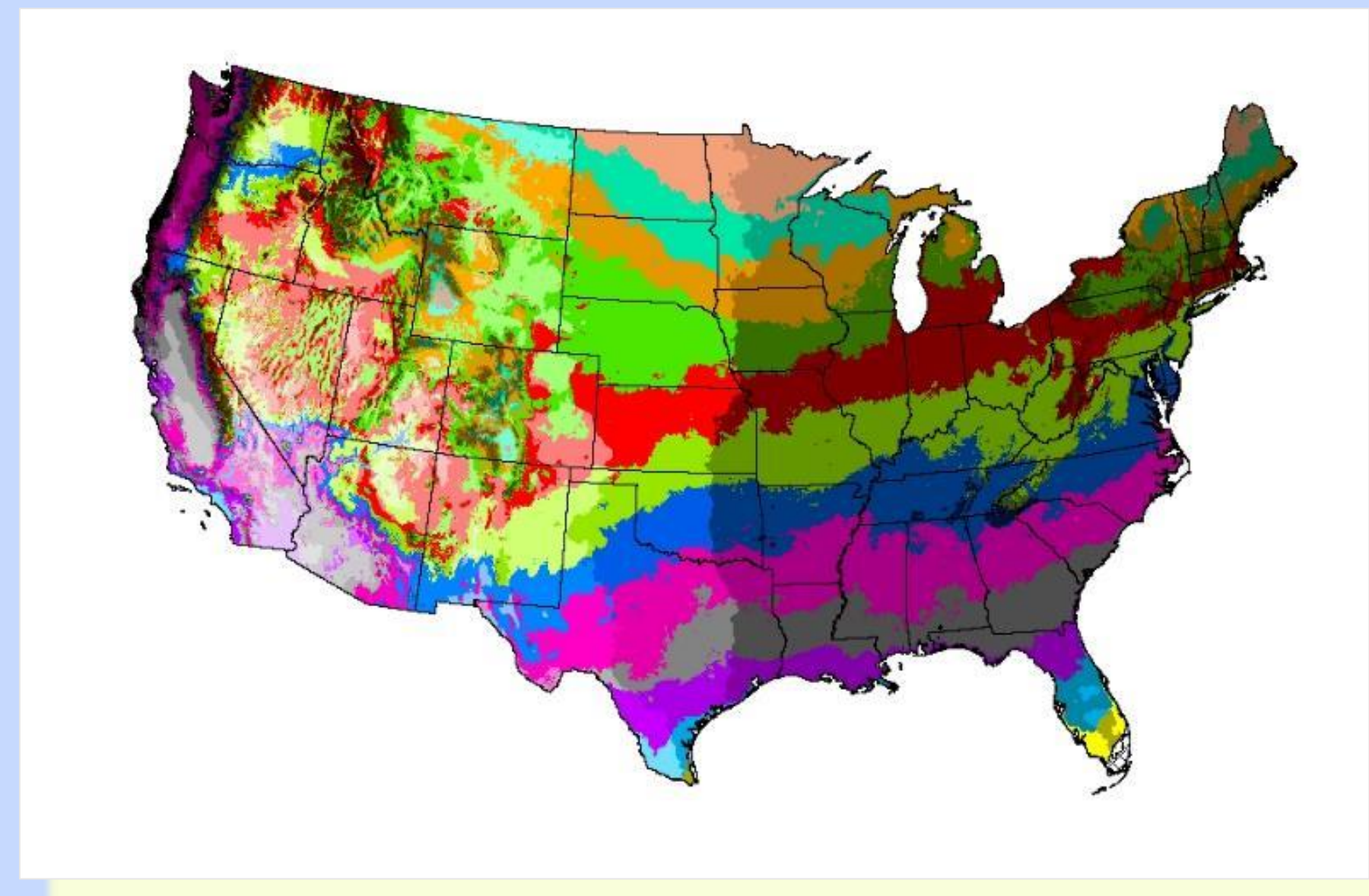

Figure 2. Provisional seed zones are areas of uniform minimum temperature and humidity

Figure 3. The WWETAC seed zone web map is designed for the desktop PC.

Web maps

The **Western Wildlands Environmental Threat Assessment Center (WWETAC)** has developed a web map that displays the seed zones. Users can enter in location coordinates, turn on reference data layers, print maps, and identify seed zones and eco-regions. This map has proven to be very popular with seed collection contractors and agency specialists. But it was not designed for mobile devices or for use in disconnected (i.e. no WiFi or mobile data) environments.
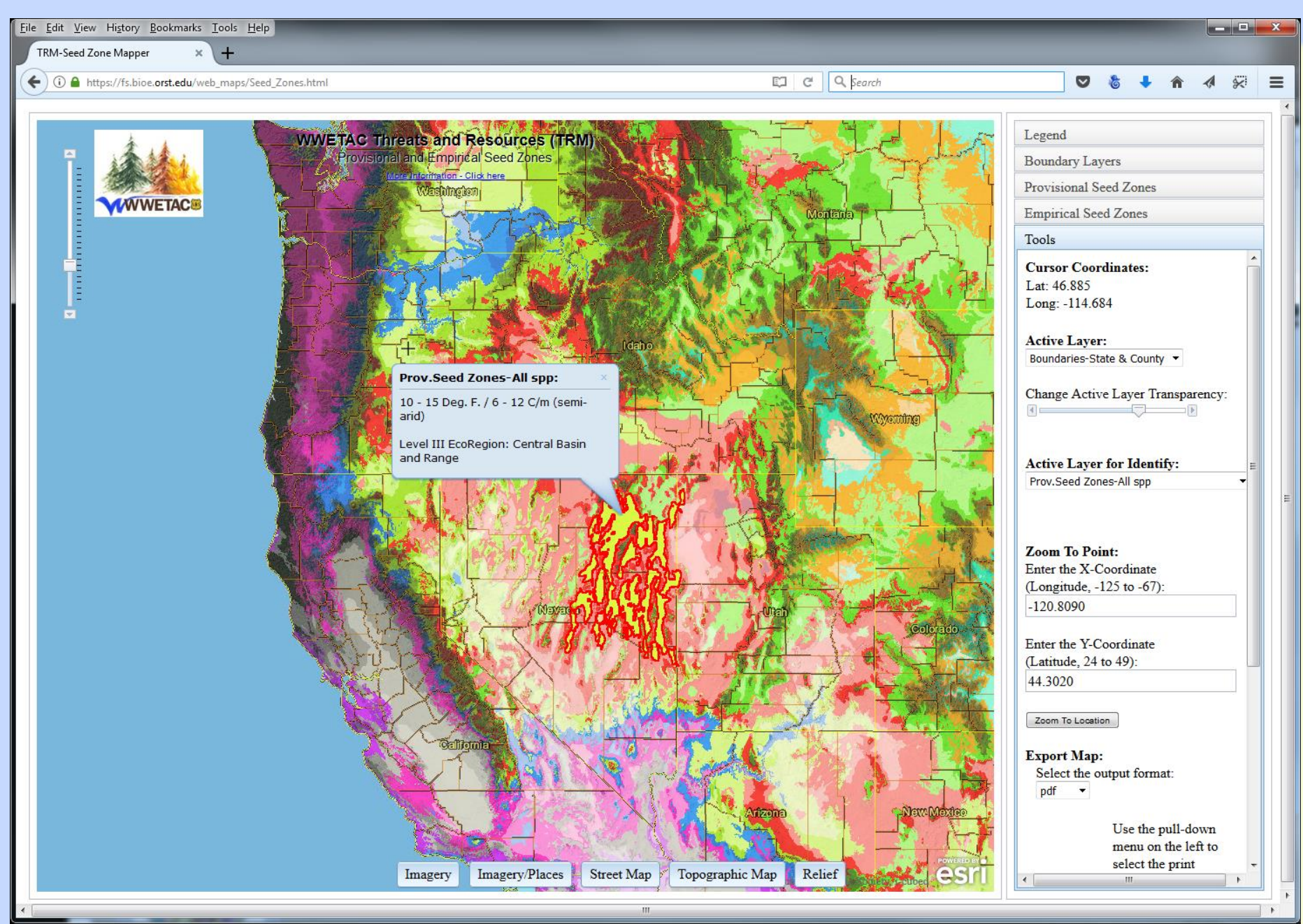

Figure 4. Mobile seed zone apps run on tablets/phones and function in disconnected (no WiFI or Mobile data) environments.

Figure 6. Work is underway to integrate mobile seed collection apps into the BLM Seeds of Success program.

Mobile maps

Supported by funding from the Great Basin Native Plant Project, we developed provisional seed zone smartphone/tablet applications that can be used in offline environments. Features include:

- Offline (Disconnected) use with map data embedded in the app.
- Switches to online data if connection detected.
- User location placed on map.
- Tap the screen for seed zone info.
- Android devices only.
- Available for the following states:
        Oregon, Washington, Idaho, California, Arizona, New Mexico, Utah, Colorado, Montana, Wyoming, Nevada.

Other seed zone mobile solutions:

ArcGIS Collector –

   Collect GIS points, images.

   iOS, Android compatible.

   Connection (Wi-Fi or mobile data) required.

Provisional Seed Zone Mobile Web map-

   No software required just a web browser.

   iOS, Android compatible.

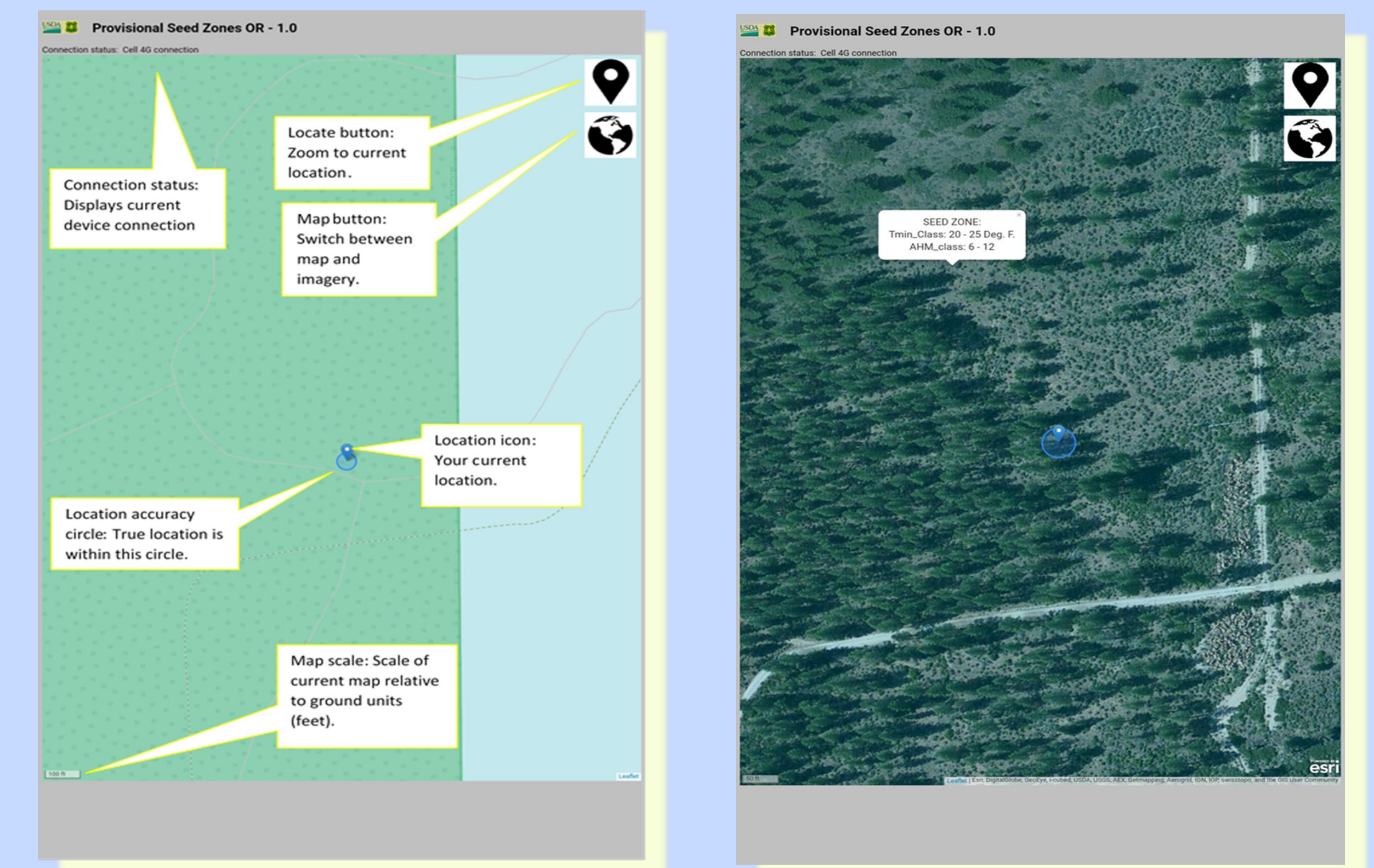   Connection (Wi-Fi or mobile data) required.

Figure 5. The statewide mobile apps have a simple interface – tap the screen to display a pop-up with the seed zone information

[1] Geneticist, USDA Forest Service Region 6 (Oregon and Washington), Olympic National Forest, Olympia WA.

[2] Geospatial Analyst/Developer, RedCastle Resources, Inc./USDA Forest Service Western Wildland Environmental Threat Assessment Center/Geospatial Technology Assessment Center, Prineville, OR cschrader@fs.fed.us 541.312.4291.

[3] Regional Geneticist and Native Plant Program Manager, USDA Forest Service Region 6 (Oregon and Washington), Pendleton OR.

[4] Center Director, USDA Forest Service Western Wildlands Environmental Threat Assessment Center, Prineville OR.

For more information, including how to download and install the applications, see the following web pages:
https://www.fs.fed.us/wwetac/threat-map/TRMSeedZoneMobile.php
https://www.fs.fed.us/wwetac/threatmap/seedZones/doc/PSZ_Android_Apps.pdf

Search: WWETAC Seed Zones

Bower, A., St Clair, B., Erickson, V. 2014. **Generalized provisional seed zones for native plants**. Ecological Applications 24(5): 913-919. https://www.fs.fed.us/wwetac/threat-map/seedZones/doc/Ecol%20Apps%20Prov%20Seed%20Zones%202014.pdf