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Repeat Photo Points Research (RPPR), Ecological Imagery Database

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CFACS faculty members and their graduate/undergraduate assistants are involved in a broad spectrum of field and laboratory research programs targeted at wildlife ecology, conservation, and protection. In an effort to enhance membership awareness, communication and collaboration, CFACS periodically highlights select research initiatives via the [CFACS Research Spotlight](#).

We have learned much about landscape change by comparing Repeat Photo Points (RPP) - photographs taken of the same place at different times. Collections of RPP have been used in studies of erosion, vegetation changes, effects of rangeland management and ecological restoration, and glacial retreat. RPP are also important in evaluating the effect of urban development on wildlife, surface temperatures, and run-off from precipitation. Existing methodology for capturing RPP needs updating to embrace modern technology and the widespread availability of digital cameras. Currently, RPP are established either by matching historical photographs with contemporary landscapes by retracing the original photographer's steps, or by establishing permanent markers in the landscape. Both methods of establishing RPP are time-consuming and laborious, and as a result established RPP have been few in number, mostly ad hoc, and uneven across landscapes. Despite over a century of RPP data collection, no central online database has emerged to serve as a hub from which existing RPP may be shared, and to which new RPP may be contributed from around the globe.



In recent years our lab has developed a modern technique for establishing RPP that is efficient and accurate. Using this technique, we have recorded 125 RPP in mountain landscapes of New Mexico, recaptured 60 of these, and determined that recaptured RPP overlap with original RPP by 93%. Our technique allows RPP establishment or recapture within minutes and can be used with any smart phone or digital camera:

1. Mount camera on a tripod and make sure it is level.
2. Record distance from camera lens to the ground in cm.
3. Record magnetic heading of camera lens with a compass.
4. Record location with GPS.
5. Compare to previous photograph(s) to check for alignment and view. Attempt to bring objects at the boundary of the field of view to match the standard photograph.

We propose establishing an online database to serve as an RPP repository (RPPR) that anyone can access and contribute to from a computer or smart device. By connecting RPP from many sources into a central, easily accessible, and open-source online database, we can build a baseline of landscape images against which future change can be measured. The database will include necessary information to locate RPP, a copy of the photograph taken at establishment, and the ability to post original RPP or recaptures.

To transform the RPPR from an idea to a reality we need two sets of collaborators. First, in order to build and maintain the RPPR we need people with technical expertise in computer science, web design, and long-term data archiving. Second, in order to grow the RPPR we need people, researchers and citizen scientists, with interest in establishing and/or recapturing RPP in diverse landscapes.

Our world is rapidly changing, and future generations would benefit from having a thorough record of current landscape conditions. At the turn of the twentieth century, the maxim “a picture is worth a thousand words” appeared as photographs conveyed complex information with a high level of detail not previously available in printed media. If one picture is worth a thousand words, what would thousands of pictures documenting current baseline states of ecosystems across the globe be worth?

For further information, additional research details and applications, and collaborative opportunities, contact Marie Stone (mstone9@uco.edu) and Paul Stone (pstone@uco.edu)

