

Appendix I

Checklist for Tephra Collection

- location (GPS and datum used)
- date collected
- collector name and contact information
- stratigraphic context - stratigraphic sections (photos or schematic) with notation of where samples were taken (tephra and radiocarbon material)
- depositional environment - subaerial, peat core, lake core, marine core, ice core, etc.
- annotated photographs with scales
- physical continuity
- thickness (min, max, average) of entire bed as well as subunits if subsampled
- mass-per-unit (MPUA) area if doing MPUA mapping
- color of deposit
- bedding characteristic (or not, could be a disseminated layer)
- sorting
- general particle size of deposit does not need to be quantitative for a field description (use White and Houghton, 2006)

Grain Size (mm)	Volcanic Terminology	Sedimentary Terminology
<1/16 (<62.5 μm)	extremely fine ash	clay
1/16 – 1/8 (62.5-125 μm)	very fine ash	very fine sand
1/8 – 1/4 (125-250 μm)	fine ash	fine sand
1/4–1/2 (250-500 μm)	medium ash	medium sand
1/2–1	coarse ash	coarse sand
1–2	very coarse ash	coarse sand
2–4	fine lapilli	granule
4–16	medium lapilli	pebble
16–64	coarse lapilli	cobble
>64	bomb/block	boulder

White, J. D. L., & Houghton, B. F. (2006). Primary volcanoclastic rocks. *Geology*, 34(8), 677-680.

- Report the maximum clast axes (both dense rock and pumiceous material) in the field because you may not collect that clast in your sample bag and therefore this information will be improperly recorded in the lab. In other words, when you collect a bulk

representative sample, it may not include the largest clast but your notes will indicate that measurement. Be sure to record the clast type (lithic or juvenile). The standard is to measure the three major axes (roughly orthogonal and the greatest) of the five largest clasts found in the deposit or section of a deposit in a given time or over a certain area.

- ❑ indicate specifically where in the section a sample is taken (top, middle, base, across the entire thickness of unit, etc.). This really makes a difference when comparing tephra deposits because there may be chemical and modal variations (zoning) throughout the section.
- ❑ indicate specifically what is sampled: bulk material, juvenile material only, etc. A bulk (channel) sample that is representative of the tephra wherever it is sampled (i.e. it could be a sub-sample of a single deposit) is preferred, so that particle size measurements and modal analyses (lithic fragment/mineral fragment/juvenile material) can be done in the lab and juvenile material can be hand picked for chemical analysis. It is much easier to compare tephra samples when comparing all parts rather than just the juvenile component.
- ❑ sample quantity - can vary greatly from proximal to distal regions. In the proximal region, where clasts can be very large, field sieving and componentry can be done on the largest fractions, above 8 mm. For very coarse remainders, one might need a very full quart bag or two quart bags. More distally, 1 quart bag for thick deposits or 1 tablespoon for thin and core samples from cores are generally sufficient. Smaller samples can be used but often leaves not material for archive or future analysis.
- ❑ sample bulk material of the entire deposit even if you subsample (ie subsamples combined should be the entire deposit)
- ❑ Samples should be stored in heavy-duty plastic bags (preferably double bagged due to damage and possible contamination accrued during transport) with sample number clearly written on bag (both sides). Fine-grained samples should be protected from being crushed to preserve original shard morphologies.
- ❑ Sample naming should be unique, and should not be changed or modified over time.