quantifying the increased soluble magnesium content in the buffered water sample via fluorescence measurement of the coordinated magnesium compound thereby determining the total hardness concentration of the water;

wherein the (1) pH-buffered liquid comprises a water soluble, non-coordinating base capable of buffering the (1) pH-buffered liquid and the buffered water sample to a pH from 8 to 12;

and wherein the (2) magnesium coordinating fluorescing reagent is selected from the group consisting of a water soluble, aromatic, ortho hydroxyl substituted azo dye; a water soluble, fused-ring heterocycle; and combinations thereof.

12. The automated method of claim 11, wherein the (2) magnesium coordinating fluorescing reagent is present in the (1) pH-buffered liquid when the pH buffered liquid is combined with the aliquot of water.

13. The automated method of claim 12, wherein the (2) magnesium coordinating fluorescing reagent is a dry powder combined with the (1) pH-buffered liquid on site.

14. The automated method of claim 11, wherein the soluble magnesium concentration in the water is known, but the soluble calcium concentration in the water is unknown, and the soluble calcium concentration is determined by subtracting the known magnesium concentration from the total hardness concentration.

15. The automated method of claim 11, wherein the water has a total hardness concentration greater than zero and not more than 2000 ppb as calcium carbonate.

16. The automated method of claim 11, wherein the (1) pH-buffered liquid is buffered to a pH from 9 to 11.

17. The automated method of claim 11, wherein the (2) magnesium coordinating fluorescing reagent is a water soluble, aromatic, ortho hydroxyl substituted azo dye selected from the group consisting of Plasmocorinth B, Eriochrome Black T, Calmagite, 8-hydroxyquinolone-5-sulfonic acid, and combinations thereof.

18. The automated method of claim 11, wherein the (2) magnesium coordinating fluorescing reagent is 8-hydroxyquinolone-5-sulfonic acid.