CLAIMS

What is claimed is:

1. A system for compacting a sediment bed containing water, the system comprising:

a surface member configured to rest on a surface of the sediment bed, the surface member comprising a base portion and a periphery wall portion extending obliquely upwards from the base portion;

a plurality of hollow elongated members affixed to a bottom side of the surface member and configured for penetrating into the sediment bed;

one or more vibration devices disposed on the surface member, the vibration device is configured to induce vibration of the surface member and the plurality of hollow elongated members; and

one or more extractors coupled to the plurality of hollow elongated members for extracting water from the sediment bed through the plurality of hollow elongated members.

2. The system according to claim 1, wherein the surface member is made of a slab of hard material.

3. The system according to claim 2, wherein the hard material is concrete.

4. The system according to any one of claims 1 to 3, wherein each of the plurality of hollow elongated members comprises a porous section configured for allowing water from the sediment bed to enter.

5. The system according any one of claims 1 to 4, wherein each of the plurality of hollow elongated members has a cylindrical cross-section and is rigid.

6. The system according to any one of claims 1 to 5, wherein the vibration device, by inducing vibration of the surface member and the one or more hollow elongated members, is operable to compact the sediment bed under the surface member and stimulate the removal of water from the sediment bed into the plurality of hollow elongated members.

7. The system according to any one of claims 1 to 6, wherein the vibration device is a pneumatic vibration device.

8. The system according to any one of claims 1 to 7, wherein the extractor is configured to extract water from the plurality of hollow elongated members through suction.

9. The system according to claim 8, wherein the extractor is an ejector pump.

10. The system according to any one of claims 1 to 9, wherein the extractor and the vibration device are configured to operate simultaneously so as to remove water from the sediment bed and compact the sediment bed under the surface member simultaneously.

11. The system according to any one of claims 1 to 10, wherein the sediment bed is underwater.

12. A method of compacting a sediment bed containing water, the method comprising:

lowering a surface member on a surface of the sediment bed and penetrating a plurality of hollow elongated members affixed to a bottom side of the surface member into the sediment bed, the surface member comprising a base portion and a periphery wall portion extending obliquely upwards from the base portion;

inducing vibration of the surface member and the plurality of hollow elongated members using one or more vibration devices disposed on the surface member; and

extracting water from the sediment bed through the plurality of hollow elongated members using one or more extractors coupled to the plurality of hollow elongated members.

13. The method according to claim 12, wherein the surface member is made of a slab of hard material.

14. The method according to claim 13, wherein the hard material is concrete.

15. The method according to any one of claims 12 to 14, wherein each of the plurality of hollow elongated members comprises a porous section configured for allowing water from the sediment bed to enter.

16. The method according any one of claims 12 to 15, wherein each of the plurality of hollow elongated members has a cylindrical cross-section and is rigid.

17. The method according to any one of claims 12 to 16, wherein said inducing vibration is operable to compact the sediment bed under the surface member and stimulate the removal of water from the sediment bed into the plurality of hollow elongated members.

18. The method according to any one of claims 12 to 17, wherein the vibration device is a pneumatic vibration device.

19. The method according to any one of claims 12 to 18, wherein said extracting water comprises extracting water from the plurality of hollow elongated members through suction.

20. The method according to claim 19, wherein the extractor is an ejector pump.

21. The method according to any one of claims 12 to 20, wherein said inducing vibration and said extracting water are performed simultaneously so as to remove water from the sediment bed and compact the sediment bed under the surface member simultaneously.

22. A method of producing a system for compacting a sediment bed containing water, the method comprising:

providing a surface member configured to rest on a surface of the sediment bed, the surface member comprising a base portion and a periphery wall portion extending obliquely upwards from the base portion;

affixing a plurality of hollow elongated members to a bottom side of the surface member, the plurality of hollow elongated members configured for penetrating into the sediment bed;

disposing one or more vibration devices on the surface member, the vibration device configured to induce vibration of the surface member and the plurality of hollow elongated members; and

coupling one or more extractors to the plurality of hollow elongated members for extracting water from the sediment bed through the plurality of hollow elongated members.