CLAIMS

1. A seawall comprising:

a floatable structure, the floatable structure having opposing ends and a base characterized by a length defined between opposing ends;

one or more water ballast compartments defined in the floatable structure; and

one or more membranes, each of the one or more membranes being a water-impermeable flexible panel having a first edge and a second edge, the first edge being coupled with the base along the length,

wherein the second edge is anchored to a seabed.

2. The seawall as recited in claim 1, wherein the base is coupled with two or more membranes, the two or more of the plurality of membranes being parallel and spaced apart from one another to form respective water-impermeable flexible layers of a multi-layered barrier.

3. The seawall as recited in claim 2, wherein the multi-layered barrier comprises one or more columns of sea water, each of the one or more columns of water being defined between adjacent ones of the two or more membranes.

4. The seawall as recited in any one of claims 1 to 3, further comprising:

a plurality of sensors, the plurality of sensors being installed at respective external surfaces of a first side of the floatable structure and a second side of the floatable structure, the plurality of sensors being configured to sense a water level difference between respective water levels at the first side of the floatable structure and at the second side of the floatable structure;

one or more pumps coupled with a respective inlet/outlet of the one or more water ballast compartments; and

a controller, the controller in operation being in signal communication with the one or more sensors and the one or more pumps,

wherein the controller is configured to adjust a water level in the one or more water ballast compartments via controllable operation of the one or more pumps in response to the water level difference sensed by the one or more sensors.

5. The seawall as recited in claim 4, wherein the one or more water ballast compartments are symmetrically distributed at each of the first side and the second side.

6. The seawall as recited in claim 4 or claim 5, further comprising a drainage channel defining a fluid communication path between the first side and the second side, the fluid communication path extending through a width of the floatable structure; and a drainage gate coupled with the drainage channel, the drainage gate being switchable by the controller between an opened state and a closed state,

wherein the drainage gate in the opened state is configured to enable a water discharge from the first side to the second side via the fluid communication path.

7. The seawall as recited in any one of claims 4 to 6, wherein in operation the controller is further configured to:

determine a change in the respective water levels sensed;

based on the change, determine if an adjustment in the respective water levels is required; and

via controllable operation of the one or more pumps, make the adjustment to the respective water levels in the one or more water ballast compartments.

8. The seawall as recited in any one of claims 1 to 7, further comprising an anchoring member, wherein the anchoring member comprises an elongate body, and wherein the second edge of each of the one or more membranes forms a continuous sealed coupling with the anchoring member along the elongate body,

wherein each of the one or more membranes comprises a contiguous sheet extending along an entirety of the seawall, the contiguous sheet being elastically deformable away from a planar shape.

9. The seawall as recited in any one of claims 1 to 8, wherein each of the one or more membranes is formed of one or more of a stab-resistant material and a reinforced composite.

10. The seawall as recited in any one of claims 1 to 9, wherein each of the floatable structure comprises a prefabricated frame defining one or more compartments, and wherein at least one of the one or more compartments is configured as the one or more water ballast compartments.

11. A seawall comprising:

a plurality of floatable structures, each of the plurality of floatable structures having opposing ends and a base characterized by a length defined between the opposing ends, the plurality of floatable structures being coupled to one another at respective ones of the opposing ends;

one or more water ballast compartments defined in each of the plurality of floatable structures;

an anchoring member, the anchoring member being disposed in/or a seabed; and

one or more membranes, each of the one or more membranes being a water-impermeable flexible panel having a first edge and a second edge, the first edge being coupled with the base along the first length, the second edge being anchored to the seabed by the anchoring member,

wherein contacting side edges of respective membranes of adjacent ones of the plurality of floatable structures are joined to one another in a continuous sealed joint.

12. The seawall as recited in claim 11, further comprising:

a plurality of sensors, the plurality of sensors being configured to sense a water level difference between respective water levels at a coast side of the seawall and at a sea side of the seawall;

one or more pumps coupled with a respective inlet/outlet of the one or more water ballast compartments; and

a controller, the controller 60 in operation being in signal communication with the one or more sensors and the one or more pumps,

wherein the controller is configured to adjust a water level in the one or more water ballast compartments via controllable operation of the one or more pumps in response to the water level difference sensed by the plurality of sensors.

13. The seawall as recited in claim 12, wherein in operation the controller is further configured to:

for any one or more of the plurality of floatable structures, determine a change in the respective water levels sensed at the first side and the second side of the one or more of the plurality of floatable structures;

based on the change, determine if the one or more of the plurality of floatable structures is exhibiting a rolling imbalance; and

via controllable operation of the one or more pumps, responsively adjust the water level in the one or more water ballast compartments of the one or more of the plurality of the floatable structures.

14. The seawall as recited in any one of claims 11 to13, wherein each of the plurality of membranes comprises a contiguous sheet that is elastically deformable away from a planar shape, wherein the plurality of membranes are deformable toward the sea side of the seawall if the respective water levels are higher at the coast side than at the sea side, wherein the plurality of membranes are deformable toward the coast side of the seawall if the respective water levels are higher at the sea side than at the coast side, wherein each of the plurality of membranes is formed of one

or more of a stab-resistant material, an anti-fouling material, and a reinforced composite, wherein optionally each of the plurality of floatable structures comprises a prefabricated frame defining one or more compartments, and wherein at least one of the one or more compartments is configured as the one or more water ballast compartments.

15. The seawall as recited in any one of claims 11 to 14, further comprising any combination of one or more of the following: (i) one or more gravity piers, each of the one or more gravity piers being coupled with one or more of the plurality of the floatable structures; (ii) one or more tension leg foundations, each of the one or more tension leg foundations being coupled with one or more of the plurality of the floatable structures, wherein the seawall optionally encloses a body of coastal waters to form a coastal reservoir, and wherein the sea side of the seawall optionally comprises at least one sloping side, the at least one sloping side serving as an inter-tidal zone.