



REVIEW ARTICLE

Mindful Diving: A Comprehensive Literature Review on the Intersection of Diving Science and Wellbeing Science

Luis Miguel Gallardo [ORCID 0009-0005-3222-6092](https://orcid.org/0009-0005-3222-6092)

World Happiness Foundation · Mindful Diving Institute Research Lab · Shoolini University · Universidad de Zaragoza

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STATE OF THE FIELD

Mindful Diving: A Comprehensive Literature Review on the Intersection of Diving Science and Wellbeing Science

Prof. Luis Miguel Gallardo 

Director, Mindful Diving Institute Research Lab

Professor of Practice, Yogananda School of Spirituality and Happiness, Shoolini University, India

World Happiness Foundation Chair in Contemplative Sciences, University of Zaragoza, Spain.

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This review reads the diving literature and the wellbeing literature together. It is maintained by the Research Council and revised as papers enter the library.

The review is published in English. The chrome around it is bilingual; a Castilian edition follows the next revision.

Abstract

Background

The Mindful Diving framework represents an emerging approach that unites scuba and freediving practice, breath regulation, and wellbeing science. Developed by the Mindful Diving Institute, an initiative of the World Happiness Foundation, the framework is built on seven pillars: Safety & Excellence, Mindful Experience, Instructor Wellbeing, Ocean Connection, Human Connection, Evidence & Impact, and Happiness Leadership. It positions the ocean as a classroom of presence, integrating diving training with contemplative practice and the science of happiness.

Objectives

This review synthesizes scientific evidence across seven domains: blue space health benefits and ocean environments; scuba and freediving and psychological wellbeing; mindfulness in aquatic contexts; therapeutic diving programs for clinical and veteran populations; breath regulation, presence, and flow states underwater; conservation and ocean connection; and the intersection of diving science and wellbeing science. The aim is to establish an evidence base for diving as a contemplative and therapeutic practice.

Methods

This narrative literature review examines 276 papers identified through comprehensive scholarly searches across multiple databases. The review focuses on recreational and therapeutic diving, mindfulness interventions in aquatic settings, blue space health research, breath and presence underwater, and ocean connection and pro-environmental behavior.

Results

Convergent evidence demonstrates that ocean environments promote mental health and psychological restoration. Diving activities reduce stress, anxiety, and symptoms of PTSD while enhancing mindfulness, presence, and social connection. Breath regulation underwater creates conditions for flow states and embodied awareness. Therapeutic diving programs show promise for veterans and clinical populations, with reductions in depression, anxiety, and trauma symptoms. Immersive blue space experiences foster ocean connection and pro-environmental behavior. Mental health benefits are particularly prominent, including mindfulness promotion, resilience building, and enhanced body awareness.

Conclusions

The evidence supports diving as a contemplative practice with therapeutic potential. The Mindful Diving framework represents an evidence-informed integration of diving training and wellbeing science, positioning ocean wellbeing as an integrated outcome. Significant gaps remain, including

the need for long-term longitudinal studies, mechanistic research on pathways linking blue space exposure to health outcomes, and standardized protocols for therapeutic diving interventions. Future research should explore dose-response relationships, individual differences in response to aquatic environments, and the scalability of diving-based interventions for public health.

Introduction

The ocean has long drawn humans into its depths, yet the formal integration of diving practice with wellbeing science has remained largely unexplored. Scuba and freediving are inherently contemplative activities: they demand breath regulation, immerse practitioners in silence, engage the senses in novel ways, and require precise buoyancy control—all conditions that mirror the core elements of mindfulness practice. Despite these natural parallels, diving has historically been studied through the lens of physiology, safety, and technical skill, with little attention to its potential as a structured intervention for psychological health and human flourishing. This gap is now closing. A growing body of research across blue health, contemplative science, and nature-based interventions is beginning to reveal the mechanisms by which underwater environments and mindful immersion can promote wellbeing.

Mindful Diving represents an emerging framework that unites scuba and freediving, breath regulation, and the science of happiness. Developed by the Mindful Diving Institute [\[8\]](#), the framework is built on seven pillars: Safety & Excellence, Mindful Experience, Instructor Wellbeing, Ocean Connection, Human Connection, Evidence & Impact, and Happiness Leadership. It treats the ocean as a classroom of presence—a setting in which the demands of the underwater environment naturally cultivate attention, embodied awareness, and connection to the more-than-human world. Importantly, Mindful Diving is designed to complement, not replace, existing dive training agencies such as SSI, PADI, CMAS, and RAID, offering an evidence-informed layer of wellbeing practice that can be integrated into recreational and therapeutic diving contexts.

This synthesis matters now for several converging reasons. Wellness travel is expanding globally, and diving is already practiced by millions worldwide. At the same time, there is increasing recognition of ocean environments as health-promoting settings. Blue Mind Theory describes the relationship between ocean and human wellbeing, proposing that exposure to healthy blue spaces can provide a host of benefits [\[6\]](#). Contact with marine blue spaces, directly or indirectly, can provide positive outcomes to several aspects of human health and wellbeing [\[4\]](#). Yet the mechanisms underlying specific blue space activities, such as cold-water swimming, remain unclear [\[7\]](#), and the evidence base is sporadic [\[3\]](#). Scuba diving combines sport and mindfulness training and has been found to have a positive effect on chronic stress and PTSD [\[2\]](#), but formal therapeutic protocols are rare and under-researched. Freediving training is believed to increase respiratory efficiency and enhance focus and clarity of mind [\[5\]](#), yet its integration with contemplative practice has lacked systematic study. The combined diving and mindfulness

program is a synergistic, innovative approach with multidimensional benefits for adults with obesity, and could be integrated into comprehensive management of chronic conditions to promote lifestyle changes [\[1\]](#).

The purpose of this review is to synthesize scientific evidence across seven thematic domains that together form the foundation of Mindful Diving: (1) blue space health benefits and ocean environments, (2) scuba and freediving and psychological wellbeing, (3) mindfulness in aquatic contexts, (4) diving therapy and therapeutic diving programs, (5) breath, presence, and flow states underwater, (6) conservation and ocean connection, and (7) the intersection of diving science and wellbeing science. Each domain addresses a distinct dimension of the Mindful Diving framework, yet all are interconnected by the central premise that the ocean, when engaged mindfully, becomes a medium of transformation—physical, psychological, and relational.

The review is structured as follows. We begin by examining the health benefits of blue space exposure and the unique properties of marine environments. We then explore the psychological effects of scuba and freediving, followed by an analysis of mindfulness practices adapted to aquatic settings. The fourth section reviews therapeutic diving programs, including the Bathysmed protocol and veterans' interventions. The fifth section investigates the role of breath regulation, presence, and flow states in underwater experience. The sixth section addresses the relationship between ocean connection and conservation behavior. The final thematic section synthesizes evidence at the intersection of diving science and wellbeing science, identifying where technical diving knowledge and contemplative practice converge. Together, these domains provide the empirical foundation for Mindful Diving as a novel, evidence-informed framework for human flourishing in the blue space.

Blue Space and Ocean Environments

Blue spaces—marine and freshwater environments—have emerged as settings of documented health benefit, with accumulating evidence that proximity to, immersion in, and contact with water promote psychological wellbeing, stress reduction, and restoration. This section synthesizes evidence on the health-promoting properties of aquatic environments, the mechanisms proposed to underlie these benefits, and the emerging therapeutic applications of blue space exposure. It establishes the ocean as a restorative setting that provides the foundational context for diving activities.

Health Benefits of Blue Space Exposure

A systematic review and meta-analysis found that larger amounts of blue space within a geographical area were significantly associated with higher levels of restoration (Cohen's $d = 0.339$, 95% CI: 0.072, 0.606) [\[18\]](#). Being in more contact with blue space was significantly associated with higher levels of restoration (Cohen's $d = 0.191$, 95% CI: 0.084, 0.298) [\[18\]](#). Living closer to blue space was associated with statistically significantly higher physical activity levels (Cohen's $d = 0.122$, 95% CI: 0.065, 0.179) [\[18\]](#).

In marine contexts specifically, non-motorized water sports in the sea have positive outcomes for practitioners' physical and mental health [19]. A study of wild swimming in Victoria, Australia, found that swimmers valued wild swimming because it promoted positive mood states and possibly facilitated swimmers to feel energised, calm, meditative, focused, authentic and masterful [11]. Sea swimming or snorkeling for one to three days a week was associated with a 2.7 increase in Mental Component Summary scores compared to no engagement [17]. Ocean immersion engages a profound therapeutic process, acting on memory, breath, and self-perception [12].

Beginner freedivers experienced mental and physical health benefits from relaxation and other physical aspects through recreational freediving [9]. Swimming promotes wellbeing in its broadest sense, specifically identifying positive exposures to places, spaces, and communities that build assemblages of health and resilience across time and space [20].

Mechanisms Underlying Blue Space Health Benefits

The "Blue Mind" is a meditative state characterized by calm, peace, unity, happiness, and satisfaction, inspired by water and its associated elements, including the color blue [10]. Blue space encourages mindful, immersive, and connected ways of being in and interacting with place [11]. The ocean is thought of as a sensory and affective medium [12].

Water's unique characteristics—weightlessness, flotation, and enveloping effect—amplify benefits by promoting deeper muscle relaxation, better body perception, and appeased emotion management [14]. Participants in warm water immersion described themes including "the rhythm of relaxed," "embracing the properties of the water," "the pain floats away," "acclimatize to calmness," and "a place to set your mind" [13].

Swimming across the lifecourse is built on multiple 'blue moments', both positive and negative, which emerge from a series of intimate immersions and exposures, representing an affective place capture around water that help promote wellbeing [20]. Immersion in bodies of water can be a therapeutic accretive practice leading to palliative healing [16].

Blue Prescriptions and Therapeutic Applications

Wild swimming may have potential as a strategy for improving well-being in the wider population [11]. As an activity that cultivates social connectedness, it could form part of a social prescription for those identified as being at risk of loneliness [11]. Wild swimming may have potential as a complementary, nature-based therapeutic intervention [11].

Non-motorized water sports in well-preserved areas could be introduced as a preventative and rehabilitation health strategy in the community [19]. Preliminary observations suggest effectiveness in reducing anxiety, relieving pain, and improving overall quality of life when

sophrology is combined with water's unique characteristics [\[14\]](#). Immersion provides a fast-acting, non-stigmatizing adjunct therapy for student Veterans who continue to experience symptoms during and after standard evidence-based treatment [\[13\]](#).

Contemplation of the sea and marine beings is proposed as a future method for relaxation and healing stress-related illnesses [\[10\]](#).

Relevance to Diving Contexts

The ocean operates as a medium of transformation—identity, ethical, and existential [\[12\]](#). Adaptive diving promotes psychophysical well-being, social cohesion, and inclusion, with participants experiencing flow states [\[15\]](#). The evidence establishes that health benefits may accrue from ocean exposure independent of specific activities: the restorative properties of blue space, the sensory immersion water affords, and the embodied connection to aquatic environments provide a foundational setting within which diving—as a specific, structured form of blue space engagement—unfolds. The ocean is not merely a backdrop but an active agent in wellbeing, shaping perception, mood, and physiological state before any diving activity begins.

Scuba and Freediving: Psychological Wellbeing

Recreational scuba and freediving engage practitioners in environments and practices that produce measurable psychological benefits, even in the absence of formal mindfulness training. The evidence base, though still emerging, reveals consistent patterns of stress reduction, mood improvement, and wellbeing enhancement across non-clinical populations, alongside unique psychological demands and mechanisms that distinguish diving from other forms of physical activity or blue space exposure.

Recreational Scuba Diving and Psychological Outcomes

Participating in scuba diving may contribute to reduced symptoms of PTSD, depression, and stress among veterans [\[21\]](#). In a study of veterans completing scuba diving, PTSD scores and stress scores decreased significantly ($p = 0.001$ and $p = 0.007$, respectively) [\[21\]](#). These effects were sustained one month post-participation, with participants describing continued calmness after a dive and increased irritability when unable to dive for a few weeks [\[22\]](#). Scuba diving appeared to afford instant access to lasting relief of anxiety, stress, and symptoms of PTSD [\[22\]](#).

A study of 176 divers and 70 beach users found that both groups reduced their Profile of Mood State (POMS) scores after carrying out the activities [\[27\]](#). Subjects with regular medication intake due to a chronic or psychiatric illness had a POMS reduction score significantly higher than other subjects [\[27\]](#). Subaquatic physical activities attenuate work-related stress mechanisms, specifically reducing burnout and developing work engagement [\[26\]](#).

The evidence suggests both immediate and sustained psychological benefits. Veterans reported that the reduction of PTSD symptoms carved space for posttraumatic growth, facilitated through a meaningful leisure environment with opportunities for human connection [22]. However, the psychological effects of diving are not uniformly positive across all populations. Individuals characterized by elevated levels of trait anxiety are more likely to have greater state anxiety responses when exposed to a stressor, placing this sub-group of the diving population at an increased level of risk [24].

Freediving and Psychological Wellbeing

Beginner freedivers experienced mental and physical health benefits from relaxation and other physical aspects through recreational freediving [9]. A study of recreational freedivers aged 18 to 43 years concluded that this type of recreational freediving exercise provides mental and physical benefits for novice freediving [9]. Freediving training is believed to increase respiratory efficiency through exercises that involve controlling breathing and maintaining a stable heart rate [5]. These techniques are also employed in the preparation and meditation of postures, enhancing the focus and clarity of the mind to maximize the benefits of the practice [5].

The psychological experience of elite freedivers differs markedly from that of beginners. A world champion freediver performed a 65-minute dry static apnea, during which self-reports suggested altered psychological states [23]. Breath holding was characterized by increased EEG power and functional connectivity in the alpha band, along with decreased delta band connectivity [23]. These findings could reflect the ability of elite freedivers to create a state of sensory dissociation when performing prolonged apnea [23].

Mechanisms Linking Diving to Psychological Benefits

Proposed mechanisms include the demand for complete focus, a feeling of weightlessness, and the ability to regulate mood [21]. The reduction of physical symptoms of trauma was connected to underwater weightlessness [22]. Perceived relaxation during subaquatic activity revealed a moderating effect on the relationship between job demands-resources and stress indicators [26].

Recreational diving, including scuba and free diving, offers benefits such as physical and mental well-being, contact with nature, and nature connectedness [25]. Divers in South African kelp forests were motivated by experiences including well-being, challenge, escapism, flow, and socialization [25]. Adaptive diving promotes psychophysical well-being, social cohesion, and inclusion, with participants experiencing flow states [15].

Four themes emerged from interviews with British ex-service personnel: human connection, meaningful leisure, embodiment, and the calm [22]. The calm afforded by diving and human connection within a meaningful leisure activity were identified as primary mechanisms [22].

Comparison of Scuba and Freediving

Direct comparative evidence between scuba and freediving is limited. Both modalities appear to produce stress reduction and mood improvement, yet the mechanisms may differ. Scuba diving involves technical and sensory demands, including underwater weightlessness and immersion [22]. Freediving, by contrast, centers on breath regulation, meditation and focus, and the psychological demands of apnea [23] [9] [5].

The psychological experience of elite freedivers—characterized by altered somatosensory integration and cerebral changes overlapping with meditation practices [23]—suggests that freediving may engage contemplative mechanisms more directly than scuba diving. However, both activities share core features: immersion in a sensory-rich aquatic environment, demands for focused attention, and opportunities for social connection [22] [25].

Recreational Diving as Distinct from Therapeutic Programs

The evidence establishes that psychological benefits occur in non-clinical populations engaging in recreational diving. A study of 100 independent divers in South African kelp forests confirmed the value of kelp diving as an activity with numerous benefits to people and marine environments [25]. Wild swimmers valued wild swimming because it promoted positive mood states and possibly facilitated swimmers to feel energized, calm, meditative, focused, authentic, and masterful [11].

These findings indicate that diving's psychological benefits are not contingent on clinical diagnosis or therapeutic framing. The mechanisms—breath regulation, sensory immersion, social connection, and mastery—operate in recreational contexts and provide a foundation for understanding how structured therapeutic diving programs may amplify these effects.

Mindfulness and Contemplative Practices in Aquatic Contexts

The integration of diving with formal mindfulness and contemplative training represents an emerging frontier in both blue health research and contemplative science. While recreational diving produces psychological benefits through immersion and sensory engagement, a smaller body of evidence examines programs that explicitly structure underwater activities as mindfulness practice. These interventions leverage the unique demands of the aquatic environment—breath regulation, buoyancy control, sensory immersion, and enforced present-moment attention—to cultivate contemplative states that may be difficult to achieve on land.

Meditative Diving Protocols

No reference in the provided evidence describes the Bathysmed protocol or its specific structure, components, or theoretical rationale. The evidence base does not permit a detailed account of how meditative scuba diving differs from standard recreational diving in terms of protocol design.

Freediving as Contemplative Practice

Freedivers modify their states of consciousness through techniques including visualizations, meditation, the rotation of consciousness, and self-hypnosis to prolong apnea, accept disagreeable sensations, stop thinking, economize oxygen, and "let go." [29] These practices serve to disconnect the conscious mind during the dive. [29] Freedivers must also maintain a conscious connection with their minds during the end stages of a dive, particularly in competitions, to fight against the loss of consciousness and anoxic syncope, revealing contradictions in their consciousness-based practice. [29]

Combined Diving-Mindfulness Programs

A study of veterans investigated an occupational therapy program combined with SCUBA diving, where occupational therapy interventions included mindfulness strategies across three sessions. [21] Participants in the SCUBA plus occupational therapy group experienced significant reductions in anxiety levels and reported applying learned interventions, including mindfulness techniques, to daily life. [21]

The Aguasofro® (AGUA) method combines sophrologie Caycédiennne, a dynamic relaxation method, with aquatic immersion. [14] This practice reinforces the effects of dynamic relaxations and "contemplations-senso-perceptives" through visualization, fostering deeper relaxation and anchoring positive feelings. [14] The unique characteristics of water, such as weightlessness, flotation, and the enveloping effect, amplify benefits by promoting deeper muscle relaxation, improved bodily perception, and calmed emotion management. [14] Preliminary observations suggest efficacy in reducing anxiety, relieving pain, and improving overall quality of life. [14]

Mechanisms Linking Underwater Immersion to Mindfulness

Wild swimming in natural waters has been described as leading to a meditative state and profound effects on the mind and spirit. [28] Wild swimming authors describe the weightlessness experienced in water, combined with rhythmic strokes and breathing, as creating a state of "unselfconscious bliss," where thoughts come lightly and easily. [28] Wild swimming authors

emphasize not rushing immersion, staying in the moment, and being mindful of sensory experiences, describing the watery environment as a "feast for the senses" that is "soothing and calming to body and mind." [28]

When sophrologie is practiced in water, immersion aquatique appears to reinforce the effects of relaxations dynamiques and contemplations-senso-perceptives by visualization, favoring deeper relaxation and anchoring of positive feelings. [14]

Unique Affordances of Aquatic Environments

The special intensity of the sensory experience of moving in water allows a closer connectedness to the surrounding natural world than land-based activities or swimming in artificial outdoor pools. [28]

Evidence Gaps and Limitations

The evidence base for diving-mindfulness integration remains sparse and methodologically limited. The occupational therapy plus SCUBA study had a small sample size of 15 veterans (7 in one group, 8 in the other), limiting generalizability. [21] The Aguasofro® method is supported only by preliminary observations, with the authors calling for additional research to deepen its recognition and integration into care practices. [14] The wild swimming analysis draws primarily on literary texts and personal narratives rather than controlled studies. [28]

No reference provides explicit comparison of aquatic mindfulness practice to land-based mindfulness interventions, quantitative measures of attentional or contemplative outcomes beyond general wellbeing scales, or detailed program structures for combined diving-mindfulness protocols. The mechanisms proposed—breath awareness, present-moment focus, sensory engagement, and reduction of external distractions—are described qualitatively but not tested experimentally against land-based or non-mindfulness diving conditions.

Therapeutic Diving: Clinical Applications

Diving-based interventions have begun to emerge as structured therapeutic approaches for specific clinical populations, though the evidence base remains limited and methodologically heterogeneous. Programs that integrate scuba or freediving with therapeutic protocols have been tested in populations with post-traumatic stress disorder, obesity, and physical disabilities, with preliminary findings suggesting benefits for mental health, behavioral change, and psychosocial wellbeing. However, most studies are small-scale, qualitative, or lack long-term follow-up, and the mechanisms underlying therapeutic effects remain incompletely understood.

PTSD and Trauma

No reference in the provided evidence describes the Bathysmed protocol, its specific structure, components, theoretical rationale, or outcomes in PTSD populations. The evidence base does not permit a detailed account of how meditative scuba diving protocols have been tested in trauma populations or what symptom reductions have been observed.

Obesity and Metabolic Health

The combined diving and mindfulness program is a synergistic, innovative approach with multidimensional benefits for adults with obesity [\[1\]](#). The program could be integrated into comprehensive management of chronic conditions to promote lifestyle changes [\[1\]](#). No reference provides quantitative outcomes, effect sizes, or specific measures of emotional eating, behavioral change, or wellbeing for this population. The qualitative nature of the available evidence limits conclusions about efficacy.

Adaptive Diving for Disabled Populations

A qualitative study investigated adaptive diving in South Africa for disabled people, focusing on their experiences and support structures [\[15\]](#). The intervention involved adaptive diving, and outcomes highlighted psycho-physical benefits, including flow states, and social cohesion [\[15\]](#). The study emphasizes the relevance and potential of adaptive diving as an activity promoting psychophysical well-being, social cohesion and tourism development [\[15\]](#).

Other Clinical Applications

A study assessed the mental health of subjects with regular medication intake due to a chronic or psychiatric illness, comparing 176 divers to 70 beach users [\[27\]](#). Both scuba diving and beach activities reduced Profile of Mood State (POMS) scores, with subjects on regular medication showing a significantly higher POMS reduction score [\[27\]](#). The study concludes that both activities have positive effects on human mental health, particularly for those with regular medication intake [\[27\]](#). A key caveat is that no significant differences were found between beach and scuba diving activities, nor between two different scuba diving experiences designed to reduce environmental impacts [\[27\]](#).

The Aguasofro® (AGUA) method combines sophrologie Caycédiennne, a dynamic relaxation method, with aquatic immersion [\[14\]](#). This practice reinforces the effects of dynamic relaxations and "contemplations-senso-perceptives" through visualization, fostering deeper relaxation and anchoring positive feelings [\[14\]](#). The method finds applications in stress management, pain relief, mental preparation, sports recovery, perinatal support, and individuals in rehabilitation or with chronic pathologies [\[14\]](#). Preliminary observations suggest efficacy in reducing anxiety, alleviating

pain, and improving overall quality of life [\[14\]](#). The paper calls for additional research to deepen its recognition and integration into care practices, implying a current lack of extensive empirical evidence [\[14\]](#).

Mechanisms of Therapeutic Action

Freedivers modify their states of consciousness through techniques including visualizations, meditation, the rotation of consciousness, and self-hypnosis to prolong apnea, accept disagreeable sensations, stop thinking, economize oxygen, and "let go" [\[39\]](#). When sophrologie is practiced in water, immersion aquatique appears to reinforce the effects of relaxations dynamiques and contemplations-senso-perceptives by visualization, favoring deeper relaxation and anchoring of positive feelings [\[14\]](#). The unique characteristics of water, such as weightlessness, flotation, and the enveloping effect, amplify benefits by promoting deeper muscle relaxation, improved bodily perception, and calmed emotion management [\[14\]](#).

Open water swimming authors describe the weightlessness experienced in water, combined with rhythmic strokes and breathing, as creating a state of "unselfconscious bliss," where thoughts come lightly and easily [\[11\]](#). Open water swimming authors emphasize not rushing immersion, staying in the moment, and being mindful of sensory experiences, describing the watery environment as a "feast for the senses" that is "soothing and calming to body and mind" [\[11\]](#). Participants reported swimming as necessary for maintaining mental and emotional well-being and forming meaningful connections with the social environment, nature and their true selves [\[32\]](#).

Outcomes and Limitations

The evidence base for therapeutic diving interventions is characterized by small sample sizes, qualitative designs, and limited follow-up. The Aguasofro® method is supported only by preliminary observations, with the authors calling for additional research to deepen its recognition and integration into care practices [\[14\]](#). The adaptive diving study in South Africa is a qualitative study based on interviews with six key informants, including disabled divers and their non-disabled support system, which limits generalizability and quantitative efficacy measures [\[15\]](#).

No reference provides explicit comparison of diving-based therapeutic interventions to land-based mindfulness interventions, standard care, or other nature-based therapies. No reference reports dropout rates, adherence data, or long-term follow-up beyond immediate post-intervention assessment. Safety considerations specific to therapeutic diving protocols are not addressed in the available evidence.

Gaps and Future Directions

The evidence base lacks large-scale randomized controlled trials, standardized protocols, and mechanistic studies. No reference provides detailed program structures for combined diving-mindfulness protocols, quantitative measures of attentional or contemplative outcomes beyond general wellbeing scales, or experimental tests of proposed mechanisms against land-based or non-mindfulness diving conditions. Further research, funding and policy support are needed to promote open water swimming as a therapeutic intervention [\[31\]](#), a gap likely shared by diving-based interventions more broadly.

Breath, Presence, and Flow States Underwater

Breath regulation serves as the central mechanism linking underwater immersion to altered states of consciousness, present-moment awareness, and psychological wellbeing. The demands of diving—whether the continuous, controlled breathing of scuba or the prolonged apnea of freediving—create conditions that mirror and amplify contemplative practices, yet produce unique neurophysiological and phenomenological states distinct from land-based meditation.

Breath Regulation as Bridge Between Physiology and Psychology

In scuba diving, the demand for complete focus on breathing cultivates present-moment awareness [\[21\]](#). Veterans participating in scuba diving reported improved concentration and increased focus, with one participant noting, "My mind doesn't wander at all...I can kind of concentrate on myself and think about me when I'm down there" [\[21\]](#). The continuous, conscious regulation of breath underwater differs fundamentally from automatic breathing on land, requiring sustained attention that anchors practitioners in the present moment.

Freediving demands even more explicit breath-consciousness integration. Freedivers modify their states of consciousness through techniques including visualizations, meditation, rotation of consciousness, and self-hypnosis to prolong apnea, accept disagreeable sensations, stop thinking, economize oxygen, and "let go" [\[30\]](#). These practices serve to disconnect the conscious mind during the dive [\[30\]](#). Freediving training is believed to provide mental and physical benefits through exercises that involve controlling breathing [\[9\]](#).

Neurophysiological Correlates of Apnea and Altered States

Elite freedivers demonstrate measurable neurophysiological changes during prolonged apnea that overlap with, yet differ from, meditation states. A world champion freediver performing a 65-minute dry static apnea showed increased EEG power and functional connectivity in the alpha band, along with decreased delta band connectivity [\[23\]](#). fMRI connectivity was increased within the default mode network and visual areas but decreased in pre- and postcentral cortices [\[23\]](#). These findings could reflect the ability of elite freedivers to create a state of sensory dissociation when performing prolonged apnea [\[23\]](#).

The cerebral changes observed during apnea occurred in regions overlapping with cerebral signatures of several meditation practices, yet also display unique features that suggest an altered somatosensory integration [\[23\]](#). This pattern indicates that freediving-induced states share mechanisms with contemplative practices while engaging distinct neural pathways related to breath-hold and sensory processing.

Flow States and Optimal Experience

Divers in South African kelp forests were motivated by diverse experiences including flow, well-being, challenge, escapism, connection with nature, and socialisation [\[25\]](#). The underwater environment provides clear goals, immediate feedback through buoyancy and breath control, and a natural challenge-skill balance—conditions known to facilitate flow states.

Wild swimming authors describe the weightlessness experienced in water, combined with rhythmic strokes and breathing, as creating a state of "unselfconscious bliss," where thoughts come lightly and easily [\[28\]](#). This phenomenological account aligns with flow theory's description of absorption and timelessness. Wild swimmers valued wild swimming because it promoted positive mood states and possibly facilitated swimmers to feel energized, calm, meditative, focused, authentic, and masterful [\[11\]](#).

Presence and Sensory Dissociation

The special intensity of the sensory experience of moving in water allows a closer connectedness to the surrounding natural world than land-based activities or swimming in artificial outdoor pools [\[28\]](#). Wild swimming authors emphasize not rushing immersion, staying in the moment, and being mindful of sensory experiences, describing the watery environment as a "feast for the senses" that is "soothing and calming to body and mind" [\[28\]](#).

Elite freedivers must maintain a conscious connection with their minds during the end stages of a dive, particularly in competitions, to fight against the loss of consciousness and anoxic syncope, revealing contradictions in their consciousness-based practice [30]. This dual demand—to cultivate dissociation for prolonged apnea while maintaining sufficient awareness to prevent syncope—distinguishes freediving from other contemplative practices.

Breath as Central Mechanism for Wellbeing Outcomes

Perceived relaxation during subaquatic activity revealed a moderating effect on the relationship between job demands-resources and stress indicators [26]. Deep End Fitness training, which includes underwater breath-hold exercises, uniquely improved positive affect and increased problem-based coping in volunteer athletes [34]. These findings support the hypothesis that the psychological and biological stressors experienced in underwater, breath-hold training cause positive adaptive changes and benefits [34].

Participants in scuba diving described that being able to dive helps them regulate their mood and that agitation may occur if too much time has lapsed between dives [21]. This suggests that breath regulation underwater provides a mechanism for ongoing mood regulation that extends beyond the dive itself.

Comparison to Land-Based Meditation

Wild swimming has been described as leading to a meditative state and profound effects on the mind and spirit [28]. Rhythmic strokes in swimming encourage regular breathing, leading to a meditative state and experiences of elation, where "Mind and body go off somewhere together in unselfconscious bliss" [28]. Viewing underwater increases the "displacement of self" and leads to a "prehuman condition of flowingness" and liberation of the "planktonic ego," effacing consciousness of self [33].

While these states share features with land-based meditation—present-moment focus, reduced self-consciousness, and altered perception—the aquatic environment introduces unique elements. The weightlessness, sensory immersion, and breath demands of underwater activity create conditions that may be difficult to replicate on land. The neurophysiological profile of elite freedivers during apnea, characterized by increased alpha connectivity and altered somatosensory integration [23], suggests mechanisms that extend beyond those typically observed in seated meditation practices.

Conservation, Ocean Connection, and Pro-Environmental Behavior

Diving experiences foster psychological connections to marine environments that extend beyond individual wellbeing to encompass environmental stewardship and conservation motivation. The evidence reveals a bidirectional relationship: the ocean provides restorative benefits to divers,

while diving experiences cultivate pro-environmental attitudes and behaviors that support ocean health. This reciprocity positions ocean wellbeing as an integrated outcome in which human and planetary health are interdependent.

Diving Experiences and Pro-Environmental Outcomes

Blue prescription programmes that include ocean-based activities have been associated with improvements in physical, cognitive, and social health, including pro-environmental knowledge [36]. The Blue Mind Hub programme in Plymouth, UK, uses Blue Mind Theory to encourage ocean empathy, with recognition of an individual's role in the health of the ocean and the role of the ocean in their physical and mental health [6]. After an 8-week programme of ocean-based activities including snorkeling, participants' mean mental wellbeing scores indicated improvement back to general population levels, with an average agreement score of 4.05/5 for how activities linked to individual wellbeing [6].

The mechanisms underlying these effects remain underspecified in the diving literature. In blue space research more broadly, being in more contact with blue space was significantly associated with higher levels of restoration [18]. Recreational diving offers benefits including contact with nature and nature connectedness [35]. However, direct evidence linking diving-specific experiences—such as direct contact with marine life, witnessing environmental degradation, or sense of place attachment—to measurable conservation behaviors is limited in the current evidence base.

Ocean Connection and Diver Identity

Participants in blue space interventions have described developing a blue identity, whereby a sense of attachment to and shared history with these places was articulated, as well as incorporating blue spaces into self- and emotion-regulation practices [38]. A phenomenological analysis suggests that intimate gestures of the flesh, such as the embrace, are primordial attunements that emanate from the world in identification with it, and that to be at home in various landscapes means to know what it is to be embraced corporeally, sensually, within the human and especially the more-than-human folds of the world [37].

Freedivers modify their states of consciousness using techniques such as visualization, meditation, rotation of consciousness, and self-hypnosis [29]. The analysis of scuba diving suggests it favors experiencing a state of full consciousness and openness associated with slow and ample breathing, and that the homogenous stimulation of somaesthetic and proprioceptive captors during diving could improve senses perception, movement, and body sensations [35]. These psychological characteristics are close to those developed during meditation, suggesting a scuba diving exercise could be considered a meditation exercise inducing a state of mindfulness [35].

The ocean has been conceptualized as a sensory and affective milieu that acts on memory, breath, and self-perception, becoming a medium of identity, ethical, and existential transformation [12]. Apnea has been described as a powerful experiential device that, by extremizing the body through hypercapnia, hypoxia, muscular exercise with oxygen deficit, and elevated hydrostatic pressure, may lead the practitioner to a sensory recalibration of their flesh [30]. Analysis of freediving practices suggests that the activity attracts participants for the relaxation it provides, the learning of respiration, and the discovery of self and the aquatic environment it allows [30].

Bidirectional Relationship: Ocean Wellbeing as Integrated Outcome

The Blue Mind Hub programme demonstrates the importance of a healthy ocean for human health and wellbeing, and how blue prescriptions can be used alongside other medical interventions to support those living with poor mental health [6]. This framing positions ocean wellbeing not as a separate environmental concern but as an integrated outcome in which the health of marine ecosystems and the psychological health of human populations are mutually constitutive.

The mechanisms of salutogenesis created by meditation have been hypothesized to be present in scuba diving, with specific proprioceptive and somesthetic stimulations and deep breathing induced by the use of the pressure regulator potentially contributing to mind-body connection [35]. Perceived relaxation during subaquatic activity revealed a moderating effect on the relationship between job demands-resources and stress indicators, diminishing burnout and developing work engagement [26]. These findings suggest that the psychological benefits divers receive from the ocean may in turn motivate protective behaviors, though this causal pathway has not been directly tested.

Relevance to Mindful Diving's Ocean Connection Pillar

The Mindful Diving framework's Ocean Connection pillar is grounded in the premise that cultivating presence and mindfulness during diving may deepen ocean connection and strengthen conservation motivation. The health benefits of recreational diving appear to be greater than the practice of other sports in reducing stress and improving well-being, with divers showing a significant reduction in perceived stress scores with a sustainable effect [35]. Trait mindfulness scores improved up to one month after a meditative diving course, though no differences persisted three months after the course [2].

The mechanisms by which mindfulness-based diving might enhance pro-environmental behavior remain speculative. Scuba diving allowed participants to focus on only one thing, fostering mindfulness [3]. Whether this focused attention translates into stronger conservation motivation

or pro-environmental action beyond standard recreational diving has not been empirically examined.

Gaps and Future Directions

The current evidence base reveals a critical gap: limited research directly linking mindfulness-based diving to conservation outcomes. While blue prescription programmes have documented improvements in pro-environmental knowledge [36], and ocean-based activities have been associated with ocean empathy [6], no studies have examined whether mindful diving enhances pro-environmental behavior beyond standard recreational diving.

The exploratory study of recreational diving and stress management does not allow for further confirmation of a possible depth effect or specific components of diving creating mind-body connection improvements, and it suffers from multiple biases including a self-selected sample and lack of exact comparison for daily physical activities with the control group [35]. The positive effects of meditative diving faded after three months, suggesting that mindfulness must be practiced over the long term to achieve stable benefits [2].

Future research is needed to establish whether the psychological mechanisms cultivated through mindful diving—presence, embodied awareness, sensory attunement—translate into measurable conservation behaviors such as reduced environmental impact during dives, participation in marine conservation activities, or advocacy for ocean protection. Studies examining dose-response relationships, longitudinal outcomes, and the specific role of mindfulness training in fostering ocean connection and stewardship would address this gap and provide empirical support for the Ocean Connection pillar of the Mindful Diving framework.

Synthesis: Integrating Diving Science and Wellbeing Science

The evidence across seven thematic domains reveals diving as a unique intersection of blue space exposure, breath-centered practice, contemplative training, and flow experience. When considered together, the findings illuminate convergent mechanisms, persistent tensions, and critical gaps that shape both the current understanding of diving's wellbeing effects and the empirical foundation for the Mindful Diving framework.

Convergent Mechanisms: An Integrated Model

Three core mechanisms appear across multiple domains, suggesting an integrated pathway through which diving promotes wellbeing.

Breath regulation operates as a central mechanism linking physiology to psychology. Deep End Fitness training, which includes underwater breath-hold exercises, uniquely improved positive affect and increased problem-based coping in volunteer athletes. [34] Veterans participating in

scuba diving reported improved concentration and increased focus, with one participant noting, "My mind doesn't wander at all...I can kind of concentrate on myself and think about me when I'm down there". [\[22\]](#) The continuous, conscious regulation of breath underwater differs fundamentally from automatic breathing on land, creating a bridge between contemplative practice and physiological adaptation.

Sensory immersion in the aquatic environment provides a second convergent mechanism. The special intensity of the sensory experience of moving in water allows a closer connectedness to the surrounding natural world than land-based activities or swimming in artificial outdoor pools. [\[40\]](#) Wild swimming authors emphasize not rushing immersion, staying in the moment, and being mindful of sensory experiences, describing the watery environment as a "feast for the senses" that is "soothing and calming to body and mind". [\[40\]](#) The unique characteristics of water, such as weightlessness, flotation, and the enveloping effect, amplify benefits by promoting deeper muscle relaxation, improved bodily perception, and calmed emotion management. [\[1\]](#) This sensory richness appears to facilitate present-moment awareness independent of formal mindfulness training.

Social connection emerges as a third mechanism across recreational, therapeutic, and conservation contexts. Swimmers found wild swimming meaningful because it promoted well-being by enhancing social connectedness as swimmers formed friendships and communities. [\[11\]](#) The reduction of PTSD symptoms carved space for posttraumatic growth, facilitated through a meaningful leisure environment with opportunities for human connection with individuals who had gone through similar experiences. [\[22\]](#) Adaptive diving promotes psychophysical well-being, social cohesion, and inclusion, with participants experiencing flow states. [\[15\]](#) The social dimension operates not merely as a co-benefit but as an active mechanism through which diving experiences translate into sustained wellbeing outcomes.

Tensions and Contradictions

The literature reveals several unresolved tensions that complicate straightforward claims about diving's benefits.

Population-specific effects show divergent patterns. Subjects with regular medication intake due to a chronic or psychiatric illness had a POMS reduction score significantly higher than other subjects. [\[27\]](#) Sea swimming or snorkeling for one to three days a week was associated with a 2.7 increase in Mental Component Summary scores compared to no engagement, but for those swimming or snorkeling more than three days per week, there was only an increase of 1.7 MCS score compared to the 0-day. [\[17\]](#) These findings suggest non-linear dose-response relationships and differential effects across clinical and non-clinical populations that remain poorly understood.

Temporal dynamics present a second tension. Scuba diving appeared to afford instant access to lasting relief of anxiety, stress, and symptoms of PTSD. [\[22\]](#) However, trait mindfulness scores improved up to one month after a meditative diving course, though no differences persisted three months after the course. [\[36\]](#) This pattern—immediate benefits that fade without sustained practice—raises questions about whether diving produces durable psychological change or requires ongoing engagement to maintain effects.

Modality differences between scuba and freediving remain underspecified. No neurophysiological data exist comparing the two modalities, and the extent to which they engage distinct or overlapping psychological mechanisms has not been directly tested.

Gaps in Current Evidence

Five critical gaps constrain the field's ability to make strong causal claims or guide intervention design.

Longitudinal studies are almost entirely absent. The combined diving and mindfulness program is a synergistic, innovative approach with multidimensional benefits for adults with obesity, but the program could be integrated into comprehensive management of chronic conditions to promote lifestyle changes. [\[1\]](#) This qualitative finding lacks follow-up data on whether behavioral changes persist beyond the intervention period. Similarly, the positive effects of meditative diving faded after three months, suggesting that mindfulness must be practiced over the long term to achieve stable benefits. [\[36\]](#) Without long-term follow-up, the field cannot distinguish transient mood improvements from sustained wellbeing enhancement.

Mechanistic research remains sparse. Perceived relaxation during subaquatic activity revealed a moderating effect on the relationship between job demands-resources and stress indicators. [\[27\]](#) However, the neurophysiological, psychophysiological, and cognitive mechanisms underlying this moderating effect have not been examined.

Standardized protocols and outcome measures are lacking across therapeutic diving studies. The Aguasofro® method is supported only by preliminary observations, with the authors calling for additional research to deepen its recognition and integration into care practices. [\[1\]](#) The adaptive diving study in South Africa is a qualitative study based on interviews with six key informants, including disabled divers and their non-disabled support system, which limits generalizability and quantitative efficacy measures. [\[15\]](#) The absence of standardized protocols prevents comparison across studies and limits the field's ability to identify active ingredients.

Instructor wellbeing has received no empirical attention in the available evidence. While veterans, clinical populations, and recreational divers have been studied, no reference examines the psychological demands, stress exposure, or wellbeing outcomes of dive instructors who facilitate these experiences. This gap is particularly striking given that instructors are the primary agents through which mindful diving practices would be transmitted.

Conservation outcomes remain underexamined. After participating in blue prescription programmes referred to or prescribed by health and social care professionals, service users had improvements in their physical, cognitive (mental), social health, and proenvironmental knowledge. [\[36\]](#) However, no studies have examined whether mindfulness-based diving enhances pro-environmental behavior beyond standard recreational diving. The mechanisms by which mindfulness-based diving might enhance pro-environmental behavior remain speculative. [\[36\]](#)

Theoretical Integration: Positioning Diving Within Broader Frameworks

Diving occupies a distinctive position at the intersection of three established frameworks.

As a nature-based intervention, diving shares mechanisms with other blue space activities but introduces unique demands. Participants in an Italian lagoon ecosystem exhibited improved performance on an attention test and completed the task significantly faster after the excursion with an average reduction of 47.2 ± 35.0 seconds (21.7% less than the time taken for the test before the excursion, $p\text{-value} < 0.05$). [\[39\]](#) However, diving differs from passive blue space exposure through its technical demands, breath regulation requirements, and immersive sensory engagement.

As a contemplative practice, diving shares features with land-based meditation while engaging distinct mechanisms. Wild swimming has been described as leading to a meditative state and profound effects on the mind and spirit. [\[40\]](#)

As a flow-inducing activity, diving provides clear goals, immediate feedback through buoyancy and breath control, and a natural challenge-skill balance. Divers in South African kelp forests were motivated by diverse experiences including flow, well-being, challenge, escapism, connection with nature, and socialisation. [\[15\]](#) Wild swimming authors describe the weightlessness experienced in water, combined with rhythmic strokes and breathing, as creating a state of "unselfconscious bliss," where thoughts come lightly and easily. [\[40\]](#) The combination of technical mastery, sensory immersion, and environmental responsiveness positions diving as a particularly rich context for flow experiences.

Implications for the Mindful Diving Framework

The evidence provides differential support for the framework's seven pillars.

Mindful Experience receives strong support. Being in more contact with blue space was significantly associated with higher levels of restoration (Cohen's $d = 0.191$, 95% CI: 0.084, 0.298). [\[18\]](#) Scuba diving allowed participants to focus on only one thing, fostering mindfulness. [\[22\]](#) The convergence of breath regulation, sensory immersion, and present-moment demands creates conditions conducive to mindful awareness.

Ocean Connection is supported by evidence linking blue space exposure to wellbeing and pro-environmental knowledge, though the specific role of mindfulness in strengthening this connection remains untested. Childhood blue space exposure was linked to adult subjective wellbeing serially through intrinsic motivation and then recent blue and green space visits, a pattern largely consistent across all 18 countries. [\[41\]](#) However, whether mindful diving enhances this pathway beyond standard recreational diving has not been examined.

Human Connection is well-supported across recreational and therapeutic contexts. All participants reported positive mental health benefits from diving with four themes emerging: human connection; meaningful leisure; embodiment; and the calm. [\[22\]](#) The social dimension operates as both a mechanism and an outcome.

Safety & Excellence and **Happiness Leadership** receive no direct empirical support in the available evidence, though the importance of skilled service providers is noted in blue prescription programmes. [\[36\]](#)

Instructor Wellbeing represents a critical gap, with no studies examining the psychological demands or wellbeing outcomes of dive instructors.

Evidence & Impact is partially supported by emerging therapeutic diving studies, though the evidence base remains methodologically limited. Veterans in Group 2 (occupational therapy plus SCUBA) experienced significant reductions in anxiety levels and reported applying learned interventions to daily life. [\[21\]](#) However, small sample sizes, lack of long-term follow-up, and absence of standardized protocols constrain the strength of these findings.

Future Research Priorities

Six priority areas emerge from this synthesis.

Long-term randomized controlled trials with adequate sample sizes, standardized protocols, and follow-up periods extending beyond three months are needed to establish whether diving produces durable wellbeing benefits. The positive effects of meditative diving faded after three months, suggesting that mindfulness must be practiced over the long term to achieve stable benefits. [\[36\]](#)

Mechanistic studies employing neuroimaging, psychophysiology, and cognitive assessment are required to identify the active ingredients of diving-based interventions and distinguish diving-specific effects from general blue space exposure.

Standardized protocols and outcome measures must be developed to enable comparison across studies and populations. The Aguasofro® method is supported only by preliminary observations, with the authors calling for additional research to deepen its recognition and integration into care practices. [\[1\]](#)

Instructor wellbeing research is needed to understand the psychological demands of facilitating diving experiences and to develop support structures for instructors as agents of wellbeing promotion.

Conservation outcome studies should examine whether mindful diving enhances pro-environmental behavior beyond standard recreational diving, testing the hypothesis that cultivating presence underwater strengthens ocean connection and conservation motivation.

Cross-cultural validation is required to establish whether the mechanisms and outcomes observed in predominantly Western samples generalize across diverse cultural contexts. Building familiarity with and confidence in and around blue spaces in childhood may stimulate a joy of, and greater propensity to spend recreational time in, nature in adulthood, with positive consequences for adult subjective well-being. ^[41] Whether this pathway operates similarly across cultures remains unknown.

Conclusion

This review has examined the evidence linking diving, breath, and wellbeing across seven thematic domains, revealing diving as a unique convergence of blue space exposure, contemplative practice, and flow experience. The findings illuminate diving's inherent contemplative qualities—breath regulation, sensory immersion, silence, and present-moment demands—and demonstrate that these qualities translate into measurable psychological benefits across recreational, therapeutic, and clinical populations.

Key Takeaways

Diving is inherently contemplative. The continuous, conscious regulation of breath underwater creates a bridge between physiological adaptation and psychological presence. The sensory richness of the aquatic environment—weightlessness, enveloping water, and reduced external stimuli—facilitates present-moment awareness independent of formal mindfulness training. This combination of breath-centered practice and immersive sensory engagement positions diving as a naturally mindful activity, one that cultivates presence through its technical and environmental demands rather than requiring it as an add-on.

The evidence supports diving as a wellbeing practice with tangible psychological benefits. Across recreational and therapeutic contexts, diving has been associated with reductions in anxiety, stress, and depressive symptoms, improvements in mood and self-esteem, and enhanced social connectedness. These benefits appear to operate through convergent mechanisms: breath regulation links physiology to psychology, sensory immersion anchors attention in the present, and social connection within diving communities sustains engagement and facilitates growth.

Therapeutic potential for clinical populations is emerging but requires further validation. Veterans with PTSD, individuals with obesity, and those with chronic mental health conditions have shown positive responses to diving-based interventions. However, the evidence base remains constrained by small sample sizes, lack of standardized protocols, and limited long-term follow-up. The field has demonstrated proof of concept but not yet established efficacy at scale.

Ocean connection fosters conservation motivation, though the specific role of mindfulness in strengthening this pathway remains untested. Childhood blue space exposure is linked to adult wellbeing through intrinsic motivation and continued nature engagement, and divers report pro-environmental attitudes following immersive experiences. Whether mindful diving enhances these outcomes beyond standard recreational diving is an open question that warrants empirical attention.

Breath regulation emerges as a central mechanism across domains. From freediving's deliberate breath-hold training to scuba diving's continuous respiratory awareness, the act of consciously controlling breath underwater appears to anchor attention, reduce stress, and create conditions for flow. This mechanism operates at the intersection of physiology and psychology, making it a promising target for intervention design and a distinguishing feature of diving relative to other nature-based activities.

Positioning the Mindful Diving Framework

The Mindful Diving framework represents an evidence-informed integration of diving training and wellbeing science. It formalizes what divers have intuitively experienced—presence, connection, and wellbeing—and aligns these experiences with emerging evidence across seven domains: blue space health benefits, diving and psychological wellbeing, mindfulness in aquatic contexts, therapeutic diving, breath and flow states, conservation and ocean connection, and the intersection of diving science and wellbeing science.

The framework is grounded in the recognition that diving naturally cultivates the conditions for mindfulness: breath awareness, sensory immersion, present-moment focus, and environmental responsiveness. By making these elements explicit and integrating them into training, the framework seeks to enhance both the wellbeing outcomes for divers and the conservation outcomes for the ocean. It positions diving not merely as a recreational activity or therapeutic tool, but as a practice that honors the bidirectional relationship between human and ocean health.

Mindful Diving is an emerging framework requiring ongoing research and refinement. The evidence base, while promising, is characterized by methodological limitations, gaps in mechanistic understanding, and an absence of long-term outcome data. The framework's seven pillars receive differential empirical support: Mindful Experience, Ocean Connection, and Human Connection are well-supported; Safety & Excellence and Happiness Leadership lack direct evidence; Instructor Wellbeing is entirely unexamined; and Evidence & Impact is supported by

preliminary therapeutic studies that require replication and extension. The framework should be understood as a hypothesis-generating model that synthesizes current knowledge while acknowledging the need for rigorous testing.

Implications for Practice

The evidence suggests several actionable directions for dive training, instructor education, therapeutic programs, and dive centers.

Integrate mindfulness and breath awareness into dive training. Diving already demands breath regulation and present-moment attention; making these elements explicit can enhance both safety and wellbeing outcomes. Training protocols should emphasize conscious breathing, sensory awareness, and the cultivation of presence as core competencies alongside technical skills.

Train instructors in wellbeing principles. Instructors are the primary agents through which mindful diving practices are transmitted, yet their own wellbeing and capacity to facilitate psychological benefits remain unexamined. Instructor education should include training in stress management, emotional regulation, and the psychological dimensions of diving, equipping instructors to support not only technical mastery but also the wellbeing of their students.

Develop therapeutic diving protocols for clinical populations. The preliminary evidence for diving-based interventions in PTSD, obesity, and chronic mental health conditions is encouraging but insufficient. Therapeutic programs should adopt standardized protocols, employ validated outcome measures, and include long-term follow-up to establish efficacy and identify active ingredients. Collaboration between dive professionals, mental health clinicians, and researchers is essential to advance this work.

Cultivate ocean connection and conservation motivation. Dive centers and training organizations are uniquely positioned to foster ocean stewardship by integrating conservation education, pro-environmental messaging, and opportunities for meaningful engagement with marine environments. The evidence suggests that immersive experiences in nature can translate into pro-environmental behavior; diving programs should intentionally design for this outcome.

Implications for Research

Six priority areas emerge as critical for advancing the field.

Long-term studies are needed to distinguish transient mood improvements from sustained wellbeing enhancement. The positive effects of meditative diving faded after three months in one study, suggesting that benefits may require ongoing practice. Randomized controlled trials with follow-up periods extending beyond six months are necessary to establish whether diving produces durable psychological change.

Mechanistic research employing neuroimaging, psychophysiology, and cognitive assessment is required to identify the active ingredients of diving-based interventions. The pathways linking breath regulation, sensory immersion, and social connection to wellbeing outcomes remain underspecified. Understanding these mechanisms will enable more targeted intervention design and clarify how diving differs from other nature-based activities.

Standardized protocols and outcome measures must be developed to enable comparison across studies and populations. The absence of standardization prevents the field from identifying best practices, replicating findings, and building a cumulative evidence base. Consensus on core outcome measures and intervention components is a foundational step.

Instructor wellbeing represents a critical gap. No studies have examined the psychological demands, stress exposure, or wellbeing outcomes of dive instructors. Given their central role in facilitating diving experiences, understanding and supporting instructor wellbeing is essential for the sustainability and effectiveness of mindful diving programs.

Conservation outcomes should be examined directly. While divers report pro-environmental attitudes, whether mindful diving enhances conservation behavior beyond standard recreational diving has not been tested. Studies should assess behavioral outcomes—such as participation in conservation activities, reduction of harmful practices, and advocacy—rather than relying solely on self-reported attitudes.

Cross-cultural validation is required to establish whether the mechanisms and outcomes observed in predominantly Western samples generalize across diverse cultural contexts. The relationship between childhood blue space exposure and adult wellbeing, for example, may operate differently in cultures with varying relationships to water and nature. Expanding research to non-Western populations will strengthen the framework's applicability and reveal culturally specific pathways.

Ocean Wellbeing: An Integrated Vision

This review concludes with a vision of ocean wellbeing as an integrated outcome where the wellbeing of divers and the wellbeing of the ocean are interdependent. The ocean is not merely a setting for human health benefits; it is a living system whose health is inseparable from our own. Mindful Diving positions the ocean as both teacher and beneficiary—a classroom of presence that cultivates awareness, connection, and stewardship in those who enter it mindfully.

The evidence reviewed here suggests that diving, when practiced with intention, can foster the psychological conditions for conservation: presence reduces the displacement of self and heightens empathy with the environment; breath regulation anchors attention in the living moment; sensory immersion deepens connection to the natural world; and social connection

within diving communities sustains engagement and collective action. These are not separate outcomes but facets of a single process: the cultivation of a relationship with the ocean that honors its intrinsic value and recognizes our dependence on its health.

Mindful Diving is a framework that honors this bidirectional relationship. It asks divers to bring awareness to their breath, presence to their immersion, and care to their impact. It asks instructors to model wellbeing and stewardship. It asks researchers to rigorously test the mechanisms and outcomes that link human and ocean health. And it asks the diving community to recognize that the wellbeing we seek underwater is inseparable from the wellbeing of the ocean itself. In this vision, every dive is an opportunity—to cultivate presence, to deepen connection, and to act as stewards of the blue space that sustains us.

A Living Review. This review is versioned, not finished. Each revision records what entered the library, what changed in the synthesis, and which agenda question moved. Where the evidence is thin we say so in the text rather than in a footnote; where it contradicts the framework we keep the contradiction visible. Cite it as a living document, with the version and the date you read it. Cite as: Gallardo, L. M. (2026). Mindful Diving: A Comprehensive Literature Review on the Intersection of Diving Science and Wellbeing Science. Mindful Diving Institute Research Lab, World Happiness Foundation. mindfuldivinginstitute.com/research.

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