January 21, 2022

To the San Francisco Estuary Partnership:

Please consider the attached comment letter on the *Estuary Blueprint*. Some background information on ballast water regulation and US EPA is also enclosed.

The letter recommends several actions intended to help persuade the US Environmental Protection Act to adopt ballast water discharge standards that are consistent with the Clean Water Act.

The letter is signed by the Center for Biological Diversity, California Sportfishing Protection Alliance, Friends of the Earth, The Bay Institute, Defenders of Wildlife, Friends of the River, San Francisco BayKeeper, Save the Bay, Blue Frontier, Wild Oyster Project, Restore the Delta, Environment Now, Golden Gate Audubon, Rotary Nature Center Friends, The Lake Merritt Institute, California Institute for Biodiversity, Sierra Club San Francisco Bay Chapter, and others.

Comment on the **Draft Action on Invasive Species** in the *2022-2027 San Francisco Estuary Blueprint*

The San Francisco Bay/Delta ecosystem is generally recognized as the most invaded estuary in the world; ballast water is the dominant vector introducing non-native species into the estuary from other parts of the world; and preventing new invasions is the most important and effective action that can be taken to address the problem of aquatic invasive species.[1]

It is thus striking that the proposed *San Francisco Estuary Blueprint* says nothing whatsoever about ballast water and contains no action of any kind to reduce the introduction of non-native species in ballast discharges. This oversight should be corrected. Specific actions to promote the effective regulation of ballast water discharges to reduce the risk of introducing harmful invasive species should be included in the *Blueprint* as priority actions.

Two relevant points should be recognized.

First, the failure to effectively regulate ballast water discharges is a public health threat as well as a critical environmental threat. Scores of human pathogens, including bacteria, viruses and protozoans, have been identified in ballast water. These include the causative agents of infectious and non-infectious diseases, nosocomial and wound infections, as well as microbes that produce air-borne toxins. Studies have also shown alarmingly high levels of antibiotic resistance in ballast water bacteria.[2] Some of these pathogenic bacteria have been carried by ballast water into new parts of the world, including the United States, where they contaminated food or water supplies and made people ill.[3] In the 1990s, ballast water introduced an emergent strain of infectious waterborne disease into South America that killed over 10,000 people.[4] Note that ballast water from overseas is discharged into the Delta upstream of intakes that provide

---

[1] Accelerating invasion rate in a highly invaded estuary, *Science* 279: 555-558 (1998).

[2] Pandemic serotypes of *Vibrio cholerae* isolated from ships' ballast tanks and coastal waters: assessment of antibiotic resistance and virulence genes (*tcp*A and *ctx*A), *Microbial Ecology* 65: 969-974 (2013). The occurrence of pathogenic bacteria in some ships' ballast water incoming from various marine regions to the Sea of Marmara, Turkey, *Marine Environmental Research* 81: 35-42 (2012).

[3] Isolation of Latin America epidemic strain of *Vibrio cholerae* O1 from US Gulf Coast, *Lancet* 339: 624 (1992). International dissemination of epidemic *Vibrio cholerae* by cargo ship ballast and other nonpotable water, *Applied and Environmental Microbiology* 60(7): 2597-2601 (1994). Emergence of a new *Vibrio parahaemolyticus* serotype in raw oysters, *JAMA* 284(12): 1541-1545 (2000). Characteristics of V*ibrio parahaemolyticus* O3:K6 from Asia, *Applied and Environmental Microbiology* 66(9): 3981-3986 (2000). PCR detection of a newly emerged pandemic *Vibrio parahaemolyticus* O3:K6 pathogen in pure cultures and seeded waters from the Gulf of Mexico, *Applied and Environmental Microbiology* 69(4): 2194-2200 (2003).

[4] Health and climate change: Marine ecosystems, *Lancet* 342: 1216-1219 (1993). Factors in the emergence of infectious diseases, *Emerging Infectious Diseases* 1(1): 7-15. Epidemic cholera in the new world: Translating field epidemiology into new prevention strategies, *Emerging Infectious Diseases* 1(4): 141-146 (1995).

drinking water to over 25 million Californians. Also, the communities most at risk from the spread of introduced waterborne diseases are generally poorer communities and communities of color, due to generally weaker water treatment, wastewater treatment and public health infrastructure, so that the government's ongoing failure to implement the level of protection from the discharge of human pathogens in ballast water mandated by the Clean Water Act could be construed as an environmental injustice.

Second, although in 2006 the California Legislature drafted and passed and the Governor signed into law the strongest ballast water discharge regulations in the world in order to protect the health and environmental safety of all Californians, the responsible state agency never implemented those regulations. Eventually, Congress took away California's authority to implement its own ballast water law, when it passed the Vessel Incidental Discharge Act (VIDA) in December 2018. Thus, the only remaining possible pathway to effective regulation of ballast discharges is to persuade the federal government to adopt and implement the necessary discharge limits.

The *Blueprint* should be amended to include the following actions:

(1) The Estuary Partners, including the State of California, should use all available means to persuade the U.S. Environmental Protection Agency (US EPA) to adopt limits on harmful non-native organisms and human pathogens in ballast discharge that comply with the Clean Water Act. The Act requires US EPA to base these discharge limits on what can be achieved by use of the "Best Available Technology." Specifically, US EPA should (a) immediately withdraw its proposed discharge limits (published in late 2020 by the previous administration), which had already been rejected by the Second Circuit Court of Appeals for failing to comply with the minimum requirements of the Clean Water Act, and had earlier been found by US EPA and other federal agencies to be far too weak to protect the environment or public health; and (b) immediately develop and publish a new proposed rule based on the Best Available Technology as defined by the Clean Water Act.

(2) The Estuary Partners should insist that US EPA base the ballast water discharge limits on the highest level of treatment that could be achieved using the best available water or wastewater treatment technology employed in purpose-built ballast water treatment plants constructed onshore at or near ports, consistent with long-established Clean Water Act case law holding that "available technology" includes treatment technology used by other industries; unless it is determined that onshore treatment is "economically infeasible" within the meaning of the Clean Water Act. In that case, US EPA should adopt discharge limits based on the highest level of treatment that can be achieved by shipboard treatment systems, as demonstrated by the publicly-available test performance of the most effective shipboard ballast water treatment system. The publicly-available test data have been reviewed twice: in a report released by Friends of the Earth,[5] and in an article published in a peer-reviewed scientific journal by three former members of the US EPA's Science Advisory Board Panel on Ballast Water

[5] *An Assessment of Ballast Water Treatment to Protect Arctic Waters*, a report for Friends of the Earth US (2018).

Treatment.[6] Both reviews found that the best commercially-available ballast water treatment systems currently in use on some ships consistently demonstrated levels of treatment that are hundreds or thousands of times more effective than is required by US EPA's current proposed rule.

(3) US EPA has argued that the best data for determining the Best Available Technology among shipboard ballast water treatment systems are test data submitted by shipboard ballast water treatment system manufacturers to obtain US Coast Guard approval for the use of their treatment systems in US waters. However, the Coast Guard has refused to release those data to the public and denied Freedom of Information Act requests submitted by the State of California and by scientists. The State of California should sue the Coast Guard to immediately release to the public all test data in its possession on the effectiveness of shipboard ballast water treatment systems.

(4) The Governor should submit to the US EPA Administrator (pursuant to the relevant section in VIDA) a formal objection to the proposed discharge limits and request their replacement with limits based on the Best Available Technology as required by the Clean Water Act, ordered by the Second Circuit Court of Appeals, and described above.

(5) Because US EPA has failed to meet the legal deadlines in VIDA for adopting new ballast water discharge limits, and by its actions has demonstrated that it is in no hurry to adopt new limits but rather is willing to continue to leave in place, indefinitely, the limits rejected by the Second Circuit in 2015, and because VIDA allows states to enforce their own ballast water laws and regulations until US EPA promulgates new limits, California should immediately begin enforcing the discharge limits that the State enacted in 2006. Alternatively, California could expeditiously develop, adopt and enforce discharge limits based on the Best Available Technology, as described above.

(6) If US EPA fails to adopt ballast water discharge limits based on the Best Available Technology as described above, Estuary Partners including the State of California should join with regional and national environmental organizations in suing the US EPA under the Clean Water Act. It should be noted that since the initial *Comprehensive Conservation and Management Plan* was published (forerunner to the *Estuary Blueprint)*, environmental organizations have sued US EPA four times over its failure to implement ballast water discharge limits as required by the Clean Water Act, and won each time; that the Court held in the most recent lawsuit that the discharge limits that US EPA is now proposing fail to meet the minimum requirements of the Clean Water Act; that the Court ordered US EPA to revise those limits accordingly; and that by proposing to simply re-adopt the limits that the Court rejected US EPA is openly defying the Court order. Note that the states of New York, Wisconsin, Michigan, Minnesota, Illinois and Pennsylvania previously filed amici curiae briefs in support of the environmental position.

(7) In addition, the California Department of Health, local public health authorities, and the offices of the Attorney General and District Attorneys should consider what other

[6] Revisiting the basis for US ballast water regulations, *Marine Pollution Bulletin* 118: 348-353 (2017).

powers they may have pursuant to their responsibilities to protect the health and safety of Californians that could be used to prevent the release of potentially fatal human pathogens into the drinking water sources for 25 million Californians, or into marine or fresh waters where such pathogens could infect seafood consumed by Californians or could infect wounds of people working or bathing in such waters.

Andrew Cohen
Director, Center for Research on Aquatic Bioinvasions

Miyoko Sakashita
Oceans Director and Senior Counsel, Center for Biological Diversity

William Jennings
Executive Director, California Sportfishing Protection Alliance

Marcie Keever
Oceans & Vessels Program Director, Friends of the Earth

Gary Bobker
Director, Rivers & Delta Program, The Bay Institute

Rachel Zwillinger
Water Policy Advisor, Defenders of Wildlife

Ron Stork
Senior Policy Staff, Friends of the River

Marc Holmes
Member, California Ballast Water Advisory Committee

Ben Eichenberg
Staff Attorney, San Francisco BayKeeper

David Lewis
Executive Director, Save the Bay

Ted Lempert
Former Assemblymember and author of California's ballast water law

Marcia Brockbank
Director, San Francisco Estuary Project (retired)

David Helvarg
Executive Director, Blue Frontier

Linda Hunter
Founder and Director, Wild Oyster Project

Barbara Barrigan-Parilla
Executive Director, Restore the Delta

Linda Sheehan
Executive Director, Environment Now

Glenn Phillips
Executive Director, Golden Gate Audubon

Katharine Noonan
Co-chair, Rotary Nature Center Friends; and Board Member, The Lake Merritt Institute

Daniel Gluesenkamp
Executive Director, California Institute for Biodiversity

Chance Cutrano
Chair, Sierra Club San Francisco Bay Chapter

EPA and Ballast Water Regulation

1970s: *EPA exempts ballast water discharges from regulation*

In October 1972, the Clean Water Act was enacted. The Act requires EPA to set discharge standards for all pollutant discharges into US waters under the NPDES permit system. The Courts have confirmed that when Congress said all pollutant discharges require permits, they meant *all pollutant discharges*. There's no provision in the Act that gives EPA the authority to exempt classes of discharges.

For nonconventional pollutants, such as organisms and pathogens in ballast water discharges, the permit conditions must include limits on the pollutant discharge that correspond to what the Best Available Technology (BAT) can achieve. The Courts have consistently ruled that Congress intended BAT to be a very high standard which includes, for any discharge, (a) the most effective technology used by any discharger in the regulated industry, (b) technologies used in other industries that could be adapted and used to treat these discharges, (c) technologies that do not currently exist but that can reasonably be constructed to treat these discharges. The Courts have repeatedly confirmed that Congress intended the BAT standard to be "technology-forcing," that is, that it would force the industry to develop more effective treatment methods.

Despite the clear language of the Clean Water Act, in May 1973 EPA exempted ballast water discharges from NPDES permit requirements, explaining that "this type of discharge generally causes little pollution."

1980s-early 1990s: *Widespread recognition of the harm caused by ballast discharges*

In the 1980s and 1990s several highly damaging invasions caused by ballast water discharges made headlines and were reported in the scientific literature, including these:

- Zebra and quagga mussels invaded the Great Lakes, where they decimated fisheries, blocked pipelines and fouled beaches, and then spread widely across eastern North America.
- The Asian clam *Potamocorbula* invaded San Francisco Bay, where it covered nearly the entire subtidal bottom, massively consumed phytoplankton, and contributed to repeated rapid transformations of the zooplankton fauna and the crash of pelagic fish species.
- The "Killer Comb Jelly" invaded the Black Sea, destroying fisheries by consuming the zooplankton that fish fed on, and grounding the fishing fleets of seven nations.
- Three species of toxic red-tide dinoflagellates — which produce human neurotoxins that accumulate in shellfish and cause Paralytic Shellfish Poisoning in humans that eat them — became established in southern Australia, resulting in the closure of shellfisheries.

- An emergent pandemic strain of cholera bacteria, which had previously been confined to Asia and Africa, was released in ballast discharges into South America, resulting in over a million people getting sick and more than 10,000 dying; ballast water also carried the bacteria into US waters, where it infected fish and oysters.

Around this time, federal and state agencies, the National Academy of Sciences, the United Nations, and other countries and parties issued statements describing the harm caused by unregulated ballast water discharges. Even EPA's own reports stated that ballast discharges cause "environmental degradation," "threat[s] to the environment and the economy," "the possibility of direct threats to human health from pathogens," "extensive economic damage to the United States," and "ecological damage [that] can also be enormous." Through all of this, EPA continued to exempt ballast water from regulation, on the sole basis that it "generally causes little pollution."

1999-2015: *Losing 4 lawsuits, EPA still fails to comply with the Clean Water Act*

In January 1999, environmental, civic, tribal and water organizations, supported by 18 members of Congress, formally petitioned EPA to repeal the ballast water exemption, arguing that it was illegal. EPA refused to respond to the petition. Environmental groups sued EPA to force it to reply (Lawsuit #1).

The environmental groups won their case in 2002, and more than three years after the petition was submitted the Court ordered EPA to respond to it within 30 days. However, EPA hadn't yet exhausted its options for delay. EPA filed a motion for reconsideration, and when that was denied filed for an emergency stay, and when that was denied and the courts again ordered EPA to reply to the petition, EPA finally said — now four-and-a-half years after it had received the petition — that it *would not* repeal its exemption of ballast water discharges.

With the way now clear, environmental groups sued EPA for refusing to implement the Clean Water Act (Lawsuit #2). They won that case in 2005 and the Court ordered EPA to repeal the exemption and, after some further procedural delay, ordered EPA to issue ballast water discharge regulations, which EPA did in September 2008. In the 36 years between the Clean Water Act going into effect and the EPA finally, after resisting as long as it possibly could, issuing some kind of discharge regulation, at least 34 and possibly as many as 87 non-native species introduced by ballast water were discovered in the San Francisco Estuary (see the attached list). These include the Asian clam *Potamocorbula* mentioned above, two species of predatory sea slugs, two Asian gobies, 13 Asian zooplankton that repeatedly caused rapid and nearly complete transformations of the zooplankton fauna in the northern arm of the Estuary, and two jellyfish from the Black Sea that further impacted the food resources for fish in the northern part of the Estuary. Other invaders that may have been introduced in ballast water include the European Green Crab, which spread from its initial invasion in San Francisco Bay north to British Columbia and poses a threat to shellfisheries, and the Chinese Mitten Crab, which clogged the gates at the Delta pumps in such enormous numbers that they were hauled away by the truckload, meanwhile shutting down Delta fish salvage operations.

Unfortunately, EPA's 2008 discharge regulations simply duplicated existing US rules and did not meet the Clean Water Act's Best Available Technology (BAT) requirement, so environmental groups sued again (Lawsuit #3). The case was settled in 2011 with EPA agreeing to (1) develop and issue new standards that complied with the BAT requirement, (2) convene a Science Advisory Board (SAB) Panel of independent scientists to assess what regulatory standard the best available technology could achieve, and (3) pay the environmental groups' legal costs.

After the SAB Panel completed its report, EPA published draft ballast discharge standards that again simply duplicated existing US regulations. To justify these standards, EPA claimed that the Panel had concluded that there were no available treatment technologies that could do any better. However, eight members of the SAB Panel and six members of a National Academy of Sciences Committee (which EPA had asked to investigate related ballast water issues) submitted a public statement that EPA had misstated and misrepresented the Panel's conclusions. The statement pointed out that there were in fact shipboard treatment systems that could meet a significantly more stringent standard than EPA had proposed, and that onshore treatment could meet a much more stringent standard. EPA's response was, essentially, that the scientists — the same scientists that EPA had asked to study the question — didn't know what they were talking about and didn't understand what their own conclusions were. EPA adopted the standards without making any changes.

So the environmental groups sued EPA again (Lawsuit #4). In its ruling the 2nd Circuit Court of Appeals stated that instead of reviewing the data and then deciding what discharge standards should be adopted, EPA had decided what standards it would adopt *before* it convened the SAB Panel or conducted any analysis of what the best available technology could achieve. The Court further found that EPA had constrained and manipulated the SAB Panel in an attempt to get it to produce the result that EPA wanted; and when EPA didn't quite get the result it wanted, it misrepresented the Panel's findings in order to justify the discharge standards it had earlier decided to adopt. The Court also found that the scientific evidence clearly showed that both shipboard and onshore treatment technologies could meet more stringent standards than EPA had adopted. In October 2015 the Court ordered EPA to develop and adopt new standards based on the higher levels of treatment that available treatment technologies could clearly meet, and to complete this by the time EPA's existing standards expired on December 19, 2018.

2015-January 2021: *EPA defies the court order*

For the previous review in 2013 — the Clean Water Act requires review and reconsideration of discharge standards every 5 years — EPA had released preliminary draft standards *two years* before it finalized standards, to allow for public comment and to give the shipping industry sufficient advance notice. But as the December 2018 deadline approached, EPA had released nothing and there was no sign that EPA had taken any steps at all toward developing new standards.

On December 4, 2018, 15 days before the deadline, the Vessel Incidental Discharge Act (VIDA) was signed into law. VIDA confirmed that EPA must set ballast water discharge standards based on the Clean Water Act's BAT requirement, but gave EPA two more years to complete the task, to December 4, 2020. Even with two additional years EPA failed to meet the deadline.

EPA issued a Notice of Proposed Rulemaking (NOPR) in October 2020, asserted that it could ignore the 2015 court order because it had decided that the Court was wrong. Instead, EPA proposed to again adopt exactly the same discharge standards that the Court had ruled did not meet the requirements of the law.

Under US law, a party that disagrees with a court order has three options: it can ask the court to reconsider; it can appeal to a higher court to overturn the order; or it can, despite its misgivings, obey the order. But it cannot just ignore the court order. Yet EPA's NOPR states that it can ignore the 2nd Circuit's order because EPA has decided that the Court was wrong.

Since January 2021: *EPA continues to defy the court order*

After the inauguration of the new administration in January 2021, several environmental groups, in letters and meetings, asked EPA to withdraw the October 2020 NOPR and develop and adopt discharge standards that meet the Clean Water Act's BAT requirement, as the Court had ordered in 2015. As of the date of this writing (January 20, 2022), EPA has refused.

Table 1. Ballast Invasions in the San Francisco Estuary 1973-2008. Non-native species introduced into the San Francisco Estuary in ballast water and first recorded in the period between 1973, when US EPA's exempted ballast water discharges from regulation, and 2008, when US EPA issued discharge standards for ballast water under court order.

Invasions that clearly resulted from ballast water transport are in black font; invasions that may have been due to ballast water are in blue font.

Data are still being compiled, and additional species may be listed

1973

Corophium alienense (Asian Amphipod)

Pseudopolydora paucibranchiata (Japanese Marine Worm)

1974

Catriona rickettsi (Nudibranch, origin unknown)

1975

Diadumene paranaensis (Anemone, origin unknown)

1976

Cirolana japonica (Japanese Isopod)

1977

Boonea bisuturalis (North Atlantic Snail)

Caprella mutica (Asian Skeleton Shrimp)

Deltamysis holmquistae (Mysid, origin unknown)

Dynoides dentisinus (Asian Isopod)

Ianiropsis serricaudis (Japanese Isopod)

Jassa marmorata (North Atlantic? Amphipod)

1978

Asellus hilgendorfi (Asian Freshwater Isopod)

Eurylana arcuata (New Zealand Isopod)

Sinocalanus doerrii (Chinese Copepod)

1979

Caprella scaura (Tropical/Subtropical Skeleton Shrimp)

Cuthona perca (Nudibranch, origin unknown)

Limnoithona sinensis (Chinese Copepod)

Oithona davisae (Japanese Copepod)

1982

Theora fragilis (Asian Clam)

Varichaetadrilus angustipenis (Eastern US Oligochaete)

1983

Gammarus daiberi (North Atlantic Amphipod)

Trochammina hadai (Japanese Foraminifer)

1984

Teneridrilus mastix (Chinese Oligochaete)

1985

Limnodriloides monothecus (North Atlantic Oligochaete)

Tridentiger bifasciatus (Japanese Goby)

1986

Monocorophium heteroceratum (Chinese Amphipod)

Nippoleucon hinumensis (Japanese Cumacean)

Potamocorbula amurensis (Asian Clam)

Pseudodiaptomus marinus (Asian Copepod)

1987

Pseudodiaptomus forbesi (Chinese Copepod)

1989

Aurelia coerulea (Asian Jellyfish)

Laonome cf. *calida* (Australian? Marine Worm)

Uromunna sp. A (Isopod, origin unknown)

1990

Carcinus maenas (European Green Crab)

1991

Marenzelleria viridis (North Atlantic Marine Worm)

1992

Acanthomysis aspera (Japanese Mysid)

Dulichia monocantha (North Atlantic Amphipod)

Epinebalia sp. (Nebaliacean, origin unknown)

Eriocheir sinensis (Chinese Mitten Crab)

Hyperacanthomysis longirostris (Asian Mysid)

Maeotias marginata (Black Sea Jellyfish)

Philine auriformis (New Zealand Sea Slug)

1993

Acartiella sinensis (Chinese Copepod)

Ascidia sp. A (Sea Squirt, origin unknown)

Eochelidium cf. *miraculum* (Amphipod, origin unknown)

Limnoithona tetraspina (Chinese Copepod)

Melita rylovae (Asian Amphipod)

Moerisa gangetica (Black Sea Jellyfish)

Paradexamine sp. (Western Pacific? Amphipod)

Paranthura japonica (Japanese Isopod)

Phyllodoce longipes (Atlantic Marine Worm)

Tortanus dextrilobatus (Asian Copepod)

1994

Ciona savignyi (Japanese Sea Squirt)

Monopylephorus evertus (Eastern US Oligochaete)

Pseudosphaeroma sp. A (Isopod, origin unknown)

1995

Crangonyx floridanus (Florida Freshwater Amphipod)

1996

Bougainvillia sp.(Hydroid, origin unknown)

1997

Ascidia zara (Japanese Sea Squirt)

Hydroides elegans (Indo-Pacific Tubeworm)

Orientomysis hwanhaiensis (Asian Mysid)

Tridentiger barbatus (Japanese Goby)

1998

Caecidotea racovitzai (Eastern North American Freshwater Isopod)

Philine orientalis (Asian Sea Slug)

1999

Daphnia lumholtzi (African/Asian/Australian Water Flea)

Littoridinops monroensis (Eastern US Snail)

2000

Exopalaemon modestus (Siberian Prawn)

Megasyllis nipponica (Japanese Marine Worm)

2001

Amaeana sp. A of Harris (Marine Worm, origin unknown)

Melanochlamys ezoensis (Japanese Sea Slug)

Spinileberis quadriaculeata (Asian Ostracod)

2002

Neoamphitrite sp. A of Harris (Marine Worm, origin unknown)

2003

Monocorophium uenoi (Asian Amphipod)

Proceraea okadai (Japanese Marine Worm)

2004

Anthopleura sp. A (Anemone, origin unknown)

Crassostrea gigas (Japanese Oyster)

Laomedia calceolifera (European Jellyfish)

Neomysis japonica (Japanese Mysid)

2005

Molgula ficus (Indo-West Pacific Sea Squirt)

2006

Caprella drepanochir (Asian Skeleton Shrimp)

Conopeum chesapeakensis (North Alantic Bryozoan)

2007

Aurila aff. *corniculata* (Asian? Ostracod)

Caprella simia (Skeleton Shrimp)

Eumida sanguinea (North Atlantic Marine Worm)

Nicolea zostericola (North Atlantic Marine Worm)

Sabellaria nanella (Atlantic Marine Worm)

2008

Spurwinkia salsa (Eastern US Snail)