

Introduction

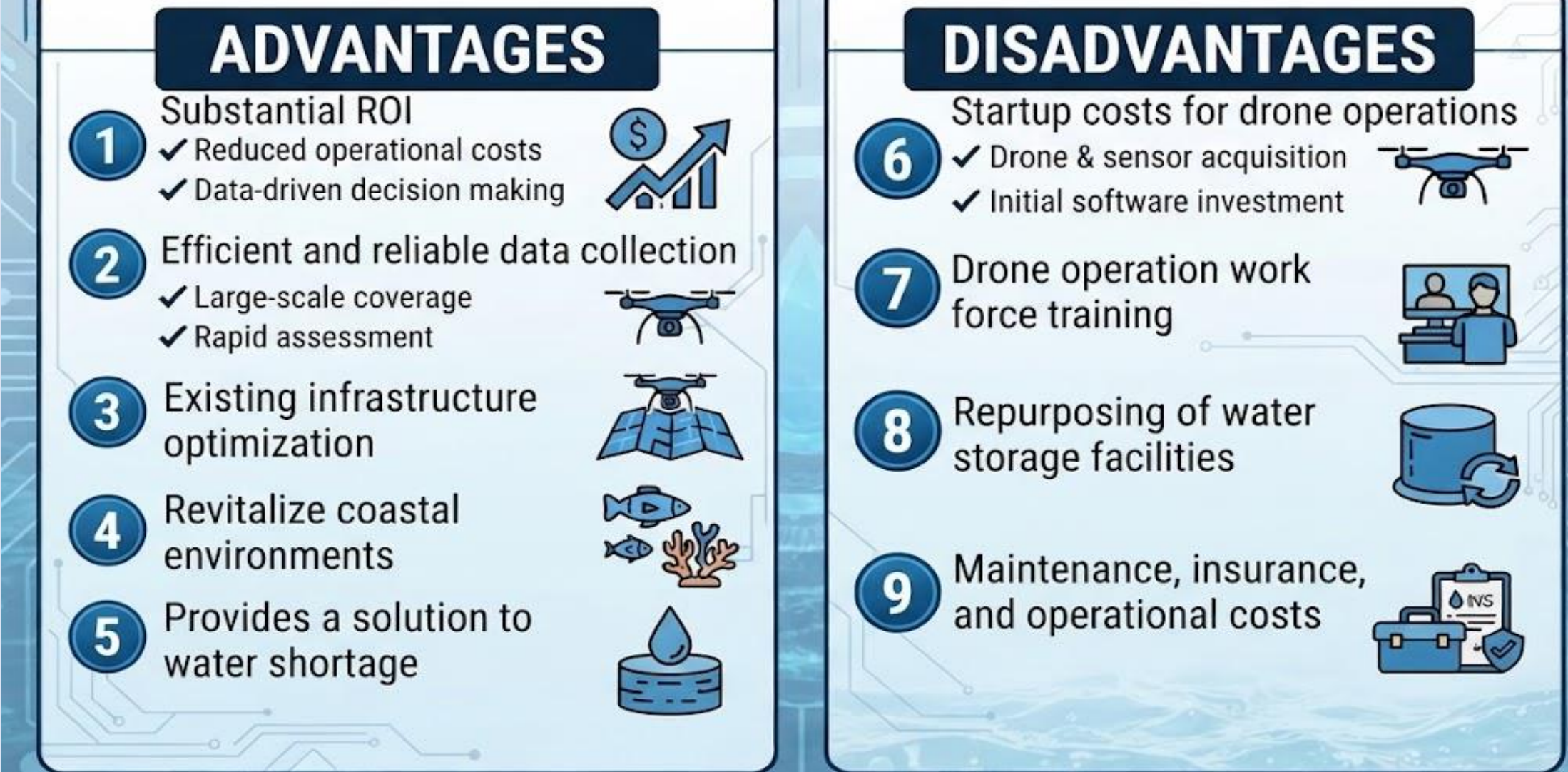
- The significant ports in California are located right where two emerging environmental threats meet: the pollution of the Pacific coast waters from chemical spills, industrial pollution, runoff, and ballast water discharge, and the state's water shortage, which leaves fewer resources to respond to wildfires.
- The following project suggests developing a port-water treatment and recovery system to tackle these issues at once. Firstly, underwater drones can be used to assess the water quality, take samples, and identify areas that require treatment.
- After that, the water collected from these sites will undergo specific treatment and a desalination process using the existing equipment at the Port of Oakland and the Port of Redwood City; all contaminants will be removed, making the water usable again.
- Thus, the treated water can be delivered to storage units and further used to combat wildfires.
- Thus, the suggested system represents a circular approach that not only solves one problem but also creates a resource from the other.

ADVANCED PORT WATER SOLUTIONS

Solution + Methodology



Advantages & Disadvantages of Aerial Drone Operations for Water Resource Management



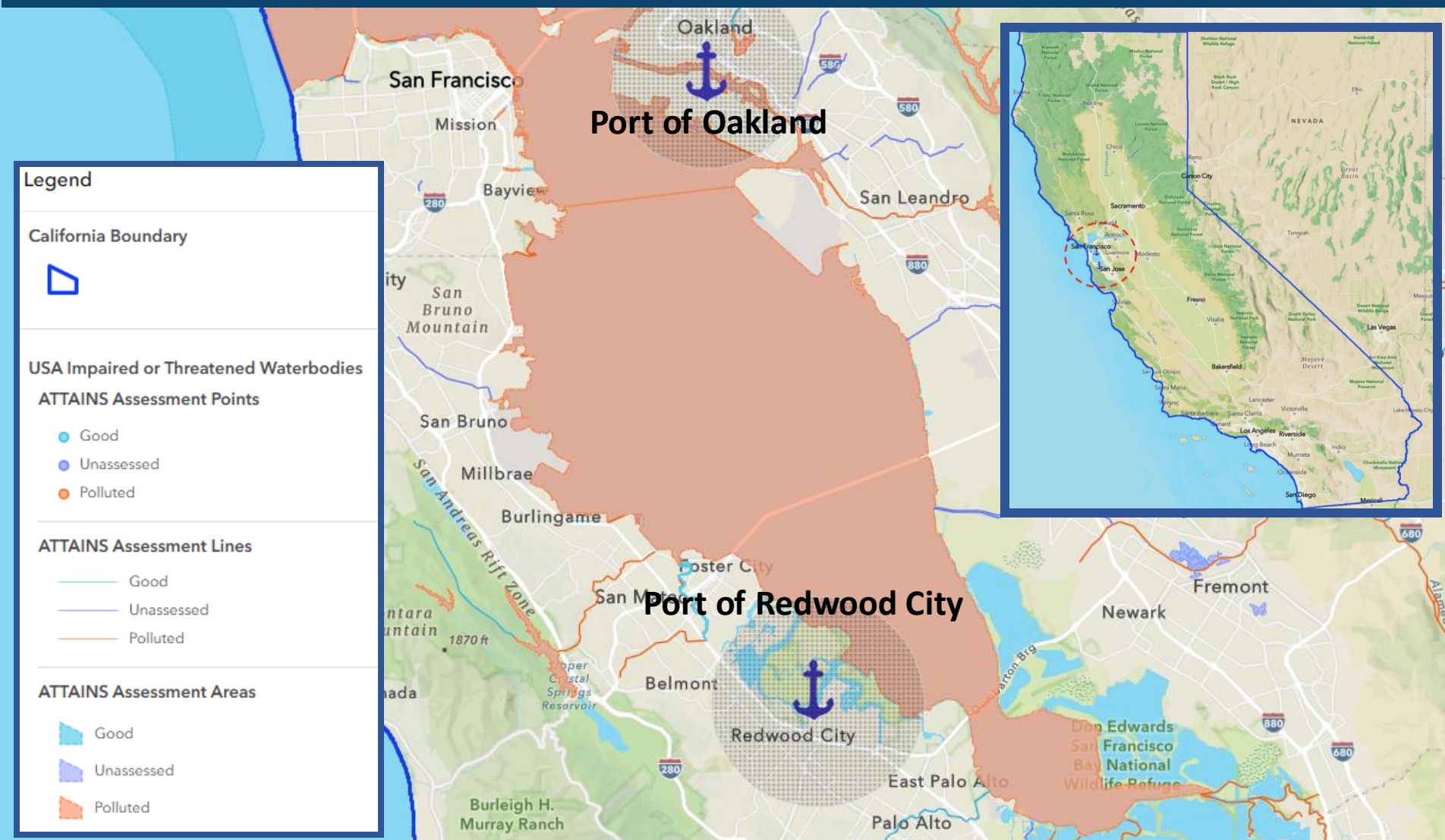
ADVANCED AERIAL SOLUTIONS | WATER MANAGEMENT INFOGRAPHIC |

Problem

- The significant ports in California are located at the intersection of two escalating environmental threats: the pollution of Pacific coast waters from chemical spills, industrial discharge, stormwater runoff, and ballast water release, and the state's ongoing water shortage, which limits the resources available to respond to increasingly severe wildfires.
- As a consequence, the health and quality of Pacific Coast waters continue to decline, damaging the California shoreline and contributing to long-term ecological degradation around major port regions.
- This combination of marine pollution and water scarcity has accelerated the deterioration of port water systems, strained emergency response capabilities, and further diminished California's already limited water supply, creating a compounding environmental challenge that threatens both coastal ecosystems and community resilience.

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Potential Port Areas for Repurposing



Hydrus AUV & YSI EXO2s: Core Subsea Equipment Specifications

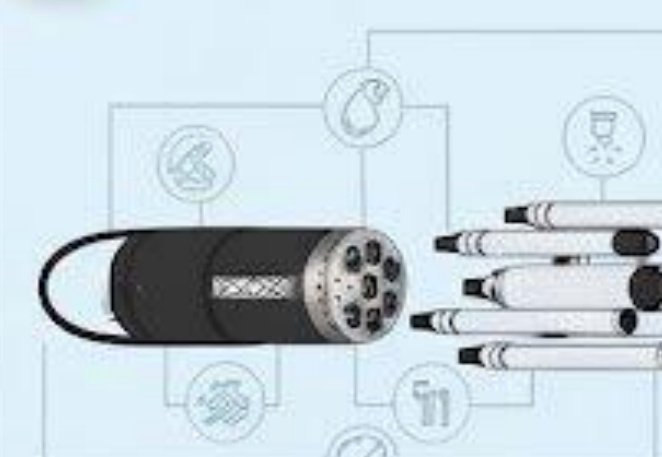
1 Drone Platform



Hydrus AUV

- Hydrus AUV: Advanced autonomous underwater vehicle.
- Obstacle detection & avoidance for safe navigation.
- 4k camera for high-resolution imaging & 3D modeling.
- Millimeter-precision photogrammetry capability.

2 Water Quality Payload



YSI EXO2s Sonde

- YSI EXO2 sonde: Multi-parameter water quality monitor.
- Titanium components for durability in harsh environments.
- Sensors for temperature, conductivity, pH, and more.
- Real-time, high-quality data transmission.

Conclusion

- Water treatment from ports is an example of a circular, sustainable approach that turns an environmental problem into an additional resource.
- Through the integration of underwater sensors, contaminant filtration, desalination, existing port infrastructure, and smart storage, this initiative addresses two of the most urgent environmental issues California faces along coastlines – water pollution and insufficient water supply in emergencies.
- The outcome of this initiative will contribute not only to improving the water quality of port waters but also to marine ecosystem rehabilitation and positive impacts on wildlife, fisheries, and coastal populations, and, at the same time, provide additional water for fighting wildfires when regular water sources are under strain.

ADVANCED PORT WATER SOLUTIONS

References



Turning the Tide: Drone-Enabled Water Recovery for Coastal Health and Wildfire Resilience

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