

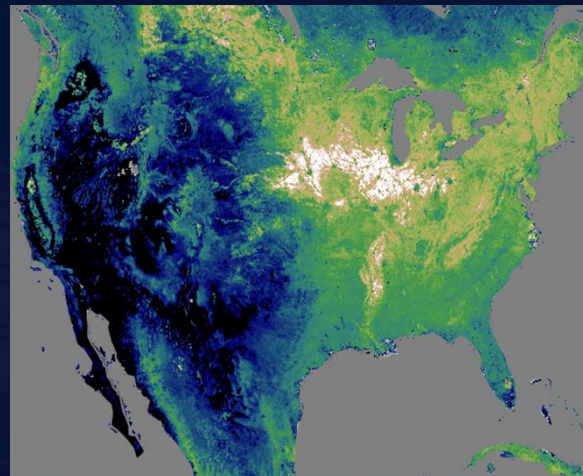
PACE: COMPREHENSIVE EARTH SYSTEM OBSERVATORY



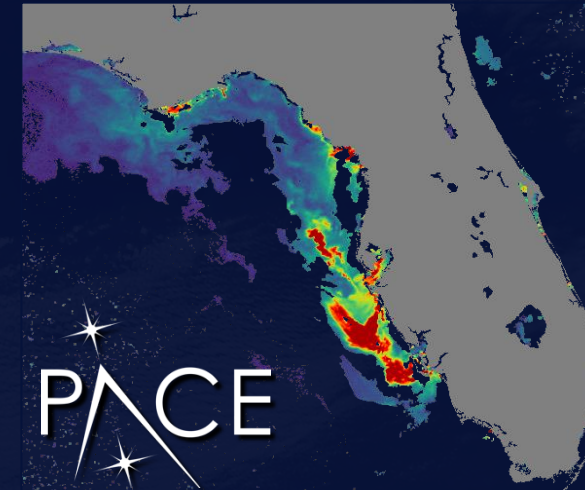
Plankton Aerosol Cloud ocean Ecosystem

- ▶ Only PACE provides global, hyperspectral coverage of the oceans, atmosphere, and land every 1-2 days, plus hyperspectral & hyperangular polarimetry
- ▶ PACE delivers all new information on the health and diversity of aquatic and terrestrial life (algae, plants), aerosol properties & modes (e.g. smoke, dust), and cloud types
- ▶ PACE is advancing space-based applications tools across water resources, air quality, land monitoring & management, public health, disasters, fisheries & more

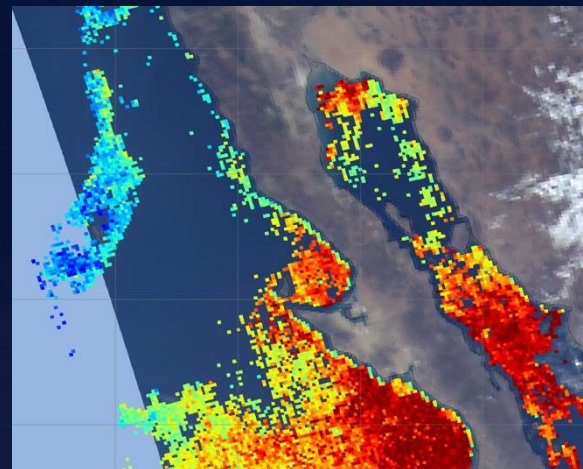
Measuring monthly plant growth across the US



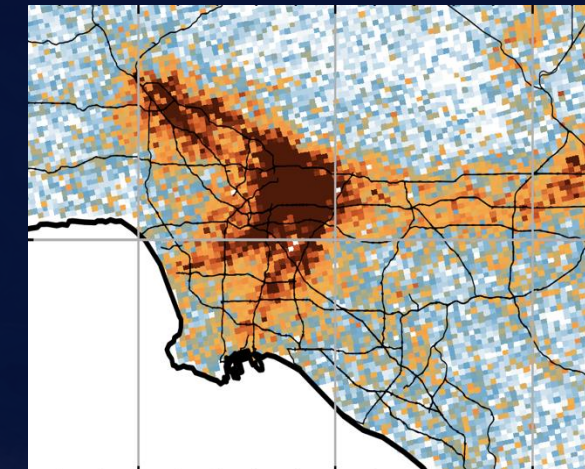
Locating a Florida coast harmful algal bloom



Identifying wildfire smoke (blues) and dust (reds)

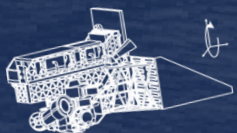


High resolution nitrogen dioxide over CA highways



PACE INSTRUMENTS

OCI



340-890 nm in 2.5 nm steps
7 discrete SWIR: 940-2260 nm
1-2 day coverage; $\pm 20^\circ$ tilt; 1.2 km

HARP2



440, 550, 670, 870 nm
10-60 viewing angles
wide swath polarimeter; 3 km

SPEXone



380-770 nm in 2-4 nm steps
5 viewing angles
narrow swath polarimeter; 2.5 km



PACE fills niches not currently addressed at home or abroad

Moving from multi- to hyper-spectral radiometry is essential for observing aquatic systems

No current or planned hyperspectral radiometer provides **1-2 day, global** coverage

UV & two 2- μm bands realize atmospheric improvements over heritage instruments

Multi-angle polarimetry adds dimensions of information (as well provides a pathfinder)

Tilt is essential for capturing marine system dynamics

PACE'S EYES IN THE SKY: SUPPORTING THE U.S. OCEAN ECONOMY FROM SPACE

Our coastlines, coastal waters & inland Great Lakes add over \$370 billion dollars to the U.S. Gross Domestic Product*
Plankton feed nearly all ocean life supporting coastal economies, our seafood supply chain, food security, and our everyday life.

PACE technology provides more information about plankton, supporting:

- Improved responsiveness of fisheries to always-changing ocean conditions
- Advanced harmful algal bloom detection & environmental monitoring for aquaculture farmers, coastal recreation & shellfish harvesting

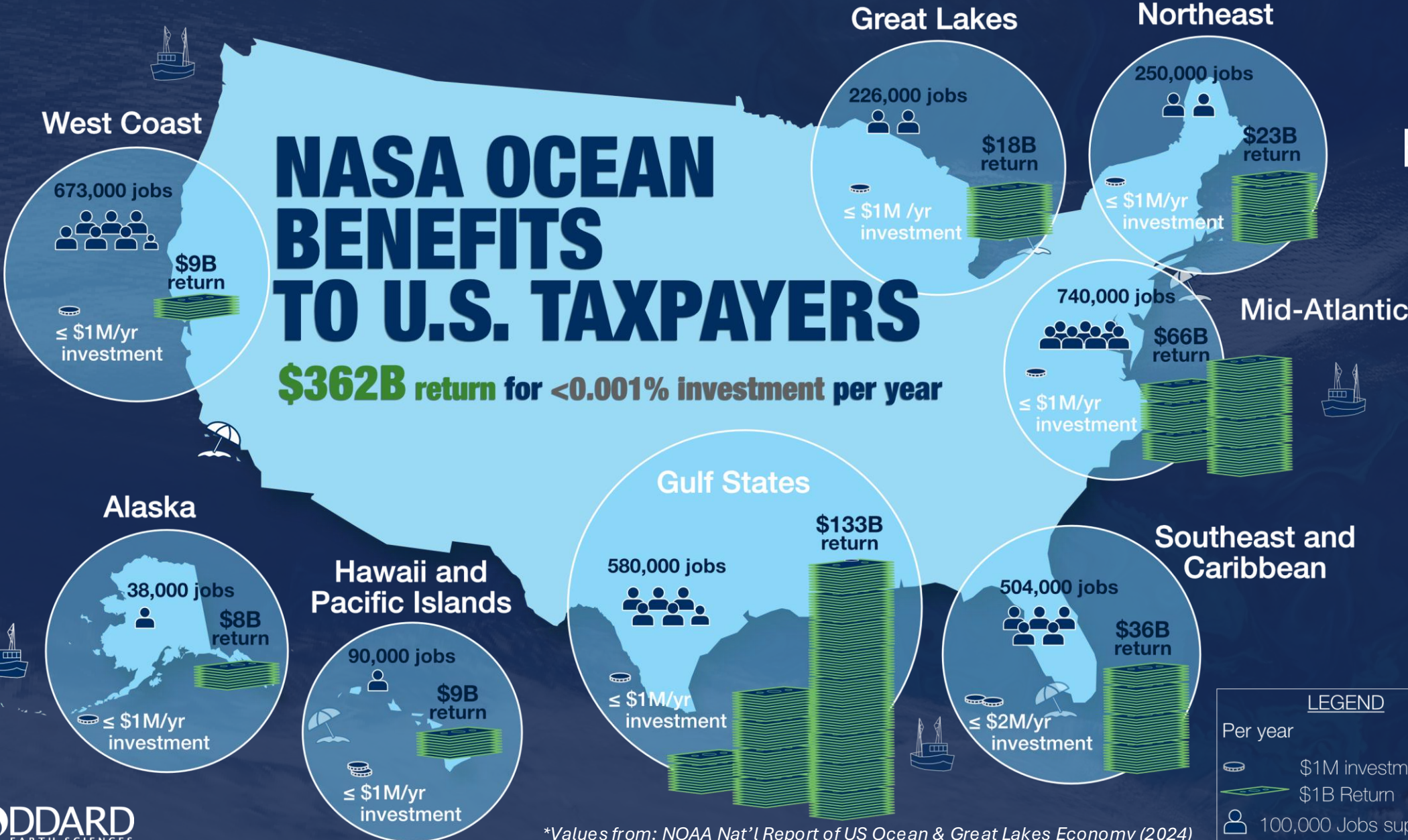


*Source: NOAA Nat'l Report of US Ocean and Great Lakes Economy (2024)

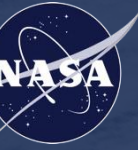
GODDARD
EARTH SCIENCES

PACE

NASA'S PACE MISSION: CONTRIBUTING TO OUR NATION'S OCEAN ECONOMY



PACE'S EYES IN THE SKY: SUPPORTING U.S. AGRICULTURE & FORESTRY



Output from U.S. agriculture and forestry contributes over \$225 billion dollars to the U.S. Gross Domestic Product*

NASA satellites have supported U.S. agriculture for decades, providing public and private land managers a space-based view of crop extent

PACE provides observations nearly every day that can enable:

- Advanced plant growth calculations
- New insights on vegetation health and condition from space
- New ways to identify plant type & land cover



Credit: NASA Acres

*Source: [USDA/US Dept of Commerce \(2024\)](#)

GODDARD
EARTH SCIENCES

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PACE'S EYES IN THE SKY: SUPPORTING AIR QUALITY MONITORING FROM SPACE

From the ground below us to outer space, PACE can see what's in the air around us, advancing applications for users across industry, Department of Defense, U.S. Navy, weather, and state agencies.

PACE sees the air & clouds with unmatched, highly accurate technology, supporting:

- Disaster response to wildfire smoke, volcanic eruptions
- National security & public safety: better weather & air visibility forecasts
- Public health: improved air quality & pollen monitoring & forecasting



NASA ER-2 high altitude aircraft view of a wildfire.