Can AI Update Baseline Data for Improved IA in Long-Term Planning Projects?

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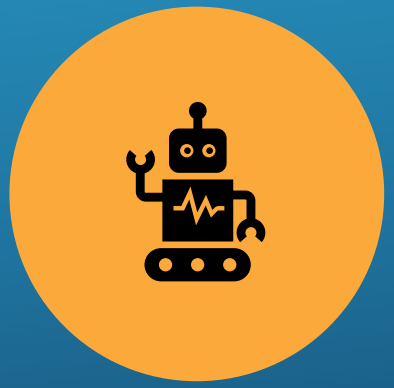
KEY TERMS AND DEFINITIONS



ARTIFICIAL INTELLIGENCE (AI)

BASELINE DATA

LONG-TERM PLANNING PROJECTS

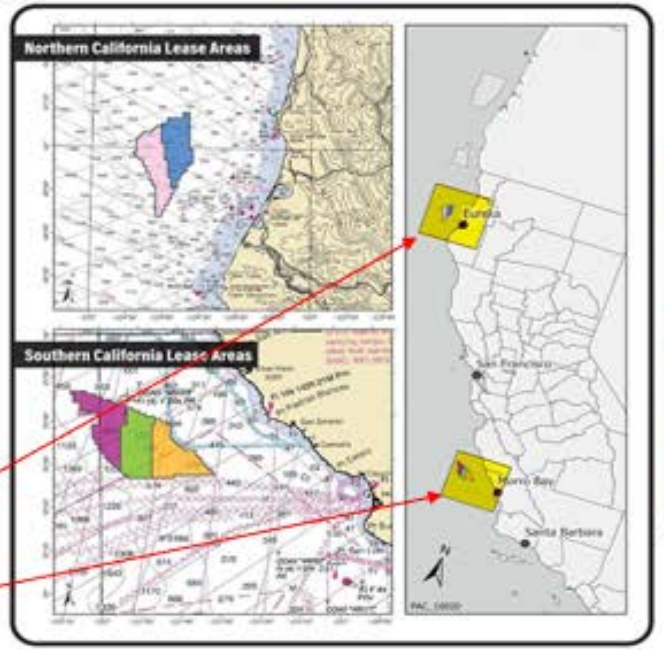

CAN AI UPDATE BASELINE DATA FOR IMPROVED IMPACT ASSESSMENT IN LONG-TERM PLANNING PROJECTS?

CASE STUDY

CALIFORNIA OFFSHORE WIND ENERGY GATEWAY

State of California's Goal: Achieve 100% clean electricity by 2045

- **One of the most aggressive greenhouse gas emission reduction agendas in the world.**
- **25 GW** of offshore wind energy **by 2045**, requiring **1,600-1,700** wind turbines to be built at a rate of **92 floating turbines per year**.
- **First-ever California offshore wind lease sale** held in 2022
- **Leased 1,501 km² (583 mi²) total "wind energy areas" (WEAs) to 5 companies**:
  - 2 WEAs – Humbolt Bay (536 km²)
  - 3 WEAs – Morro Bay (974 km²)



Provisional Winners of the California Lease Areas, $757,100,000 in High Bids

LEASE AREA		
OCS-P0561	RWE Offshore Wind Holding, LLC	$157,700,000
OCS-P0562	California North Floating LLC	$173,800,000
OCS-P0563	Equinor Wind US LLC	$130,000,000
OCS-P0564	Central California Offshore Wind LLC	$150,300,000
OCS-P0565	Invenergy California Offshore LLC	$145,300,000

BOEM Bureau of Ocean Energy Management

CALIFORNIA OFFSHORE WIND ENERGY GATEWAY 2016-2022

- Compendium of information to support IA and decision-making for California offshore wind long-term planning
- Supports Bureau of Ocean Energy Management (BOEM) Renewable Energy Task Force
- Includes:
  - 1,015 member-uploaded spatial datasets using GIS
  - 111 maps
  - 17 galleries of member-created information collections

California Offshore Wind Energy Gateway

In support of the Intergovernmental Renewable Energy Task Force

Search by keyword or location

powered by DATA BASIN

Get Started | Explore | Create | Community | Workspace

What is the Offshore Wind Energy Gateway?

What can I do?

How do I start exploring?

The Offshore Renewable Wind Energy Gateway assembles geospatial information on ocean wind resources, ecological and natural resources, ocean commercial and recreational uses and community values. This information will help identify areas off of California that are potentially suitable for wind energy generation.

read more

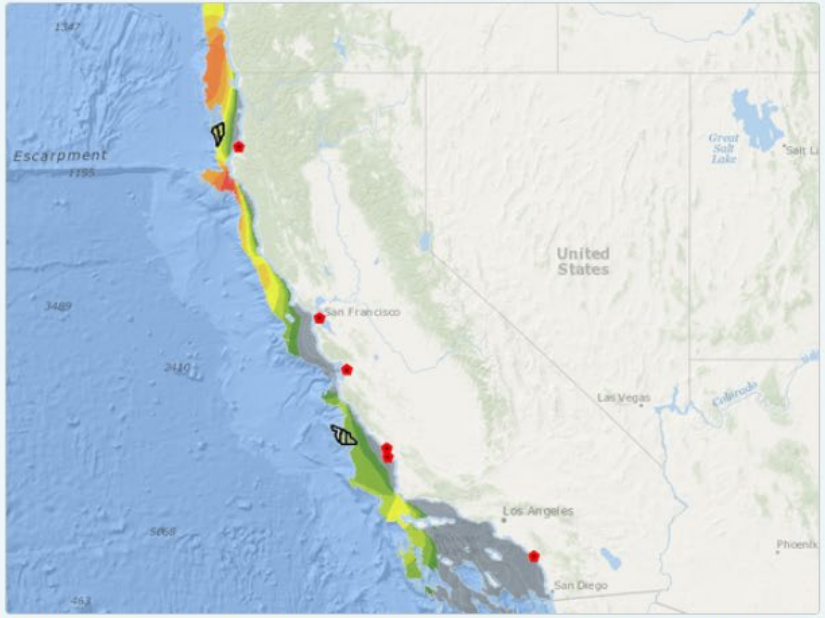
Wind Energy Resource & Demand

Jurisdictions & Boundaries

Bathymetry & Geology

Marine Fisheries

California Offshore Wind Energy Lease Areas



This map shows data highlighting wind resources and offshore wind energy lease areas along the coast of California.

Featured Items

Gallery

Schatz Energy Research Center - Northern California and Southern Oregon Offshore Wind Transmission Study

Gallery

California Energy Commission AB 525 Offshore Wind Strategic Plan- Sea Space

Gallery

California Offshore Wind Energy - Key Planning Data and Information

Map

CA Offshore Wind Energy: Biological Habitat Areas

Datasets

Spatial information for visualization or download.

see all 938 datasets

Recommended Datasets

Seabird Spring Survey Compilation: Observations from various surveys between 1975 and 2008

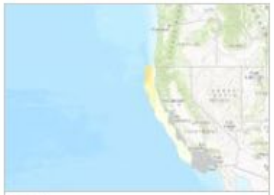
Compilation of 29 surveys varying in survey methods, temporal and geographic extent along the California coast.

Seabird distribution layers are from CDAS, a compilation of at-sea survey data maintained by RG Ford Consulting Company under contract to CDFW-OSPR. The seabird layers here show mean density (weighted to survey effort) from the following surveys, from 1975 through 2008.

For more details please view "Data Layers" tab for survey methods from...

Report: California Seabird Ecology Study. Prepared by the Institute of Marine Sciences, University of California, Santa Cruz, for the Pacific OCS Region, Minerals Management Service, Contract No. 14-12-001-30183. vii and 153 pp.

read more

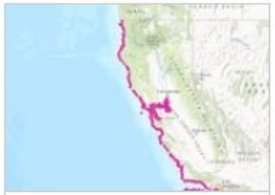


Dataset

California Offshore Wind Speed: Monthly Ave. across Year (2007 - 2013)

Dataset

Offshore Wind Resource Potential



Dataset

ACP Environmental Sensitive Sites

Dataset

Essential Fish Habitat

Dataset

Marine Protected Areas Inventory, March 2012

2022-2025

- November 2024 –California Offshore Wind Draft Programmatic Environmental Impact Statement published.
- February 2025 - Public comment period ended.
- Baseline data beginning to age, becoming less accurate/relevant.

Next Steps:

- Public comment incorporated into Final PEIS.
- Subsequent site-specific NEPA analyses and consultations for individual proposed wind energy projects.

CAN AI BE USED TO UPDATE BASELINE DATA WITHIN THE GATEWAY FOR IMPROVED IMPACT ASSESSMENT IN FUTURE ENVIRONMENTAL ASSESSMENTS?

YES!

HOW?

AI TOOLS AND METHODS

Data collection and integration

Data cleaning and processing

Data analysis and modeling

Visualization and dashboards

Automated monitoring and alerts

AI WORKFLOW STEP 1:
DETECT OUTDATED DATA AUTOMATICALLY

AI can scan datasets and flag parts that are:

Older than a set threshold (e.g., >5 years)

Missing values or low sampling frequency

Conflicting with newer satellite/sensor inputs

TOOLS = Rule-based checks and anomaly detection algorithms

AI WORKFLOW STEP 2:
FILL GAPS USING REMOTE SENSING

New satellite data can be processed rapidly with AI to…

Detect changes in wave activity, ocean depth, shipping activity

Use image recognition, machine learning to compare current conditions with baseline data

Track coastal erosion, shoreline development, marine wildlife

TOOLS: Google Earth Engine + CNNs or temporal models

AI WORKFLOW STEP 3: SPECIES AND HABITAT UPDATES

Outdated species distribution models can be **updated** using:

New survey data (acoustic, visual, habitat cover, water quality)

Crowdsourcing (public observations, reporting)

Machine learning models trained (or retrained) on environmental variables (salinity, etc.)

TOOLS: MaxEnt, Random Forest, other algorithms to conduct species distribution modeling

AI WORKFLOW STEP 4: TEXT/DATA MINING

Mining **data sources** to produce new insights by identifying trends

California Offshore Wind Energy Gateway

Updates from BOEM, NOAA, other agencies

Social data – human activity patterns, newly designated protected areas

TOOLS: GPT, Haystack, LLMs fine-tuned on environmental and social data

ENSURING DATA ACCURACY

Automation

- Reduces human error, ensures data consistency

Data Validation Rules

- Rules to verify data accuracy upon entry; flag errors

Regular Audits

- Compare data entries with original sources

Quality Control Measures

- Peer reviews, cross-validation

Training

- Staff training on data handling

Data Quality Review

- Tracking performance indicators like error rates

- Current US administration ban on new offshore wind leases; halting issued approvals
- Industry uncertainty and risk
- Mass layoffs at companies working on Humboldt offshore wind projects
- Future of projects supporting offshore wind unknown, at least in near-term.
- AI will continue to advance.

Let’s continue the conversation!

Message me your questions or comments in the IAIA25 app.

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