# Available Information and Data Gaps: Birds, Bats, Marine Mammals, Sea Turtles and Threatened & Endangered Species

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# Sea Turtle Baseline

## Species

- Leatherback and Loggerhead Sea Turtles most likely off Oregon
- Green and Olive Ridley Sea Turtles could occur
- All listed under Endangered Species Act
  - Leatherback Critical Habitat


## Occurrence

- Tropical; all uncommon north of Mexico
- Migrate to offshore waters to feed
  - Summer upwelling
  - Benthic and pelagic organisms
- Gillnet fishery impacts
- Leatherbacks <1,700 in west coast U.S. waters

# Marine Mammal Baseline

## Cetaceans

- 24 species
  - 7 baleen whales; 17 toothed whales
  - Blue, Fin, Humpback, Sei, North Pacific Right, Orca, and Sperm ESA listed

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## Pinnipeds

- 6 species
  - Steller Sea Lion ESA listed (CH)
  - Guadalupe Fur Seal ESA listed

- Sea otter – ESA listed; stragglers from WA
- Broad-scale distribution and habitat, and population status known for most species
- Human-related threats - ship strikes, entanglement, others

# Bat Baseline

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## Bats

- Little information on offshore bat occurrence
- Migratory species most likely and most vulnerable (e.g., Hoary Bat)
- Farallon and Channel Islands have bat presence
  - Low wind speeds, low moon illumination, and relatively high degrees of cloud cover predicted arrivals and departures
  - Low barometric pressure predicted arrivals
- Mid-Aug – late Sep

## Birds

- Surveys have identified a diversity of species or species groups on OCS
- Nearshore and shoreline species
  - Sea ducks, loons, grebes, shorebirds, gulls, terns
  - Western Snowy Plover & Marbled Murrelet – ESA listed
- Pelagic species primarily 8-35 miles offshore
  - 29 species including tubenoses, skuas, alcids
  - Pelagic shorebirds, terns, gulls
- Changing status
  - Short-tailed Albatross & Hawaiian Petrel – ESA listed
  - Rare but increasing
  - Knowledge of distribution changing…occurring off Oregon

# Pelagic Bird Presence and Abundance

**Semi-monthly bar chart of seabird abundance off Oregon**
(primarily 8-35 miles offshore)

Key

- **absent or very rare:** less than annual
- **rare:** a few expected on less than half the trips
- **uncommon:** expected in low numbers on 50-75% of the trips
- **common:** expected in good numbers on most trips

| Species | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Laysan Albatross | | | | | | | | | | | | |
| Black-footed Albatross | | | | | | | | | | | | |
| Northern Fulmar | | | | | | | | | | | | |
| Pink-footed Shearwater | | | | | | | | | | | | |
| Flesh-footed Shearwater | | | | | | | | | | | | |
| Buller's Shearwater | | | | | | | | | | | | |
| Sooty Shearwater | | | | | | | | | | | | |
| Short-tailed Shearwater | | | | | | | | | | | | |
| Manx Shearwater | | | | | | | | | | | | |
| Leach's Storm-Petrel | | | | | | | | | | | | |
| Fork-tailed Storm-Petrel | | | | | | | | | | | | |
| Red-necked Phalarope | | | | | | | | | | | | |
| Red Phalarope | | | | | | | | | | | | |
| South Polar Skua | | | | | | | | | | | | |
| Pomarine Jaeger | | | | | | | | | | | | |
| Parasitic Jaeger | | | | | | | | | | | | |
| Long-tailed Jaeger | | | | | | | | | | | | |
| Black-legged Kittiwake | | | | | | | | | | | | |
| Sabine's Gull | | | | | | | | | | | | |
| Common Tern | | | | | | | | | | | | |
| Arctic Tern | | | | | | | | | | | | |
| Common Murre* | | | | | | | | | | | | |
| Pigeon Guillemot* | | | | | | | | | | | | |
| Cassin's Auklet | | | | | | | | | | | | |
| Marbled Murrelet* | | | | | | | | | | | | |
| Ancient Murrelet | | | | | | | | | | | | |
| Xantus's Murrelet | | | | | | | | | | | | |
| Rhinoceros Auklet | | | | | | | | | | | | |
| Tufted Puffin | | | | | | | | | | | | |

* - indicates abundance primarily or exclusively nearshore.



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# Renewable Energy Effects – Birds, Bats, Mammals & Turtles

## Activities

- Construction and operational phases
- Vessel traffic, seismic surveys, foundation and cable installation
- Turbine operation, foundation protection, cables, vessels

## Effects

- Collision and entanglement; barotrauma in bats
- Prey base and habitat alteration/creation; trash ingestion in turtles
- Displacement and movement barriers
- EMF effects
- Light attraction
- Pollution
- Noise impacts
  - Masking of sounds, displacement, behavioral changes, physical impairment, mortality

## Marine Birds

- Spatial and temporal abundance of birds
- Bird activity at night
- Important areas of bird activity that should be avoided
- Important migration patterns
- Potential effects on seabird prey

## Marine Mammals

- Fundamental baseline data – migration routes & home ranges
- Immediate monitoring of cetaceans to understand interactions
  - Videography
  - Beachings
  - Tagging
  - Vessel surveys

# Summary of Knowledge – Gaps

## Sea Turtles

- Evaluate seasonal use of the OCS including post-hatchling stages
- Noise and EMF effects
- Comprehensive population estimates
  - Difficult due to solitary nature and wide distribution

## Marine Mammals

- Site-specific baseline data on occurrence, distribution, behavior
- Site-specific acoustic effects – low frequency sensitivity
  - Harbor seals, baleen whales, harbor porpoises
- Impacts on gray whales
- Acoustics
  - Ambient sounds at potential wave energy facilities
  - Hearing sensitivity and response of cetaceans and pinnipeds

# Summary of Knowledge – Gaps

## Birds

- Site-specific seasonal distribution and abundance - scale
- Seasonal density maps
  - Feeding, breeding, high use areas, migration routes, colony flight pathways
- Dodging behavior
- Migration corridors
  - Distance from shore, timing, passage height, each with weather/climate
- Prey consumption to determine energetic consequences
  - Model energetic needs
- Effects of EMF, noise, lights and structures; collision risk

# Atlantic Wind Energy Workshop – Gaps

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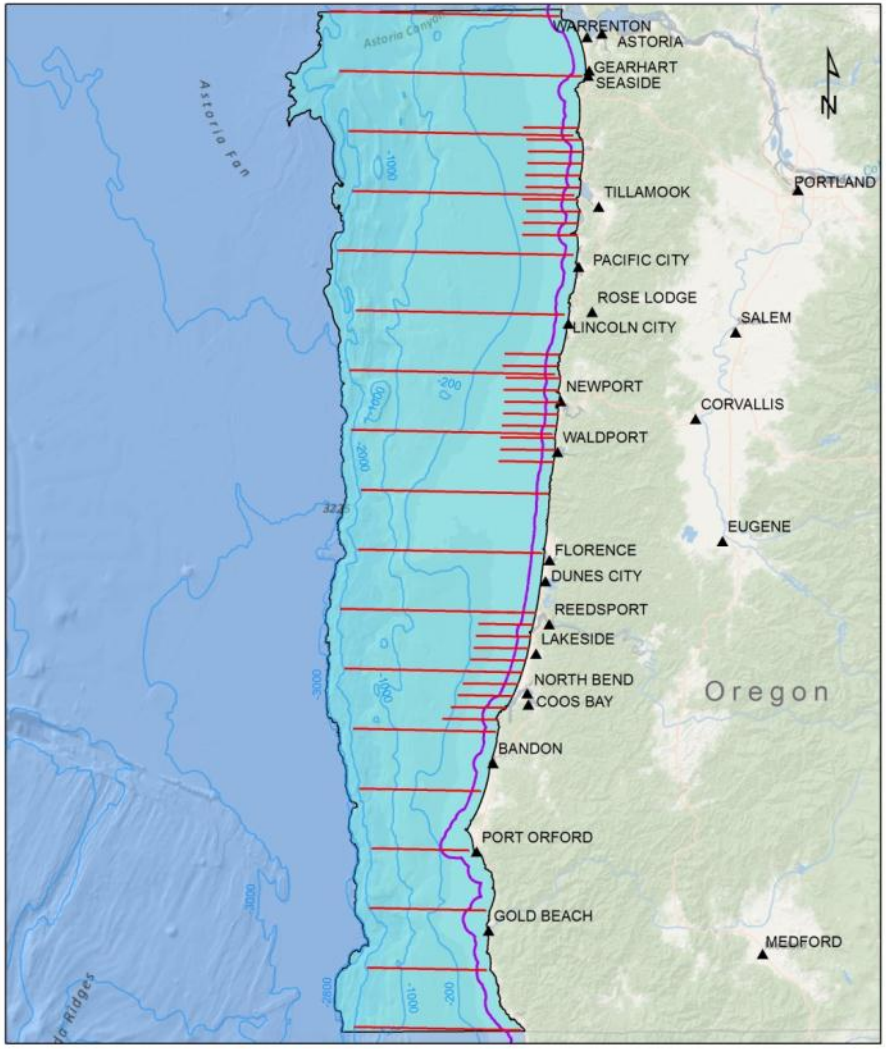
## Marine Birds and Bats

- Nocturnal movement patterns
- Migration routes and shortcuts
- Sensitivity analysis
- Distribution data
- Abundance data
- Decision support tool

# Seabird & Marine Mammal Surveys

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## Seabird and Marine Mammal Surveys

- Distribution, abundance and habitats of marine species
- Validate and enhance aerial survey data for indicator, breeding and migratory species
- 12 surveys completed 2010-2012
  - 20 year comparison to surveys in 1989-1990 and other products

## Vulnerability index for scaling possible adverse effects of renewable energy projects on seabirds – Pacific OCS

- Analyze data on flight height as a function of wind speed and species
- Develop sensitivity index that ranks key vulnerability factors
- Use results to inform siting and operation of facilities

# Pilot Studies in the Atlantic

## Acoustic/Thermographic Monitoring

- Combination detection device that can verify recorded vocalizations to species via simultaneous thermal imagery
- Information on bird presence near OCS structures
  - Circadian, seasonal, annual, weather-related

## Aerial High-Definition Imaging

- Minimize error and disturbance to birds
- Evaluate combinations of aircraft type and hi-def camera type, mounting systems, and onboard recording systems
- Determine effective sampling schemes
- Recommend sampling design and cost estimates

## Summary of Knowledge

- Collected, reviewed, and compiled post-1977 information
  - San Francisco Bay to Grays Harbor
- Easy electronic access and retrieval of all information collected
- Identified data gaps

## Protocols for Baseline Studies and Monitoring

- Guidance on consistent approach to collecting baseline and pre-construction information prior to offshore renewable projects
- Guidance on the stressors to monitor and methodologies

## Effects of EMFs on Elasmobranchs & Other Marine Species

- Summarized EMF sensitivity of marine organisms
- Identified knowledge gaps, research priorities, potential mitigations

## Using Ongoing Activities as Surrogates

- Identify and analyze data from ongoing projects (surrogates) with similar stressors and receptors
  - EMF from operating power cables; marine mammals and anadromous fishes
  - Mooring of aquaculture and buoys; marine mammal entanglement
- Other appropriate surrogates may be identified

## Predicting Consequences of Wave Energy Absorption on Nearshore Ecosystems

- Develop statistical model that predicts potential effects of wave energy absorption from marine renewable energy facilities
- Needed to predict how siting of wave energy facilities may generate detectable changes in nearshore, especially kelp forests

## Study on Wind Power Affect on Birds & Bats

- Three-year study on impacts of offshore wind energy development
- Develop instruments to measure how turbines affect birds and bats
  - Instruments to tune out flying debris; focus on wildlife
- Relevant to onshore and offshore wind turbines

# Ideas for Potential Future Studies

## Data Synthesis and Predictive modeling of seabird distribution - Pacific OCS

- Identify, collect and synthesize data from all available marine bird surveys along the U.S. Pacific OCS
- Develop a predictive statistical model of seabird distribution
- Produce high-resolution predictions of seabird abundance patterns

BOEM
Bureau of Ocean Energy Management

# Summary

## Birds, Bats, Marine Mammals, Sea Turtles and T&E Species

- Varying amounts of baseline information for offshore species
- Seasonal variability and abundance generally known at broad scale
- Need to fill gaps on site specifics, densities, and effects
- Studies have been completed, in process or planned to fill gaps; however, there are still gaps to be addressed



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