



# OXBOW ASSOCIATES, INC.

Wetlands Delineation and Permitting • Wildlife Studies • Herpetology • Vernal Pool Ecology

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## Qualifications and Representative Project Experience

Oxbow Associates, Inc. (OA) is a Massachusetts based wetlands and wildlife consulting company providing **Environmental Permitting** services to clients in Massachusetts and adjacent states. OA conducts **Wetland Delineations** and **Wildlife Evaluations**, provides **Wetland Replication and Restoration** services, and offers **Sound Permitting Strategies** for diverse projects ranging from private clients to transportation, photovoltaic generation, water development, gas and electrical transmission and government.

OA specializes in evaluating habitat for regulated species, whether plant or animal, and finding solutions to match projects with the applicable performance standards applicable to the project. We were able to gain approvals for a 9 MW wind generation project located on a property with 23 state-listed plant and animal species along with hundreds of other successful permitting accomplishments.

OA integrate our full GIS and drone capabilities into our wetlands related services as well as our rare and endangered species work as applicable. Our greater than 50 years combined experience studying the behavior and ecology of rare and endangered wildlife species, with peer reviewed publications and cooperative work with government agencies provides us with a reputation for understanding the ecology of the subject species and an ability to provide tenable solutions to potentially fatal conflicts between project needs and regulatory requirements.

OA's wildlife services include site habitat evaluations, preparation of formal habitat assessment documents and client representation. We conduct dedicated field studies for salamanders, frogs, turtles, snakes, rare vascular plants and terrestrial and aquatic invertebrates. Our rare species work incorporates some projects include field surveys, live trapping and drift-fence surveys, and/or radio-telemetry in order to facilitate project approvals. In addition to our regular Massachusetts wildlife studies and permitting, we have conducted field studies and permitting for rare wildlife projects in Rhode Island, New Hampshire, Vermont, Connecticut, and New York.

### Wildlife

OA has extensive, first-hand field experience assessing habitats for and working with state and federally protected vascular plant, invertebrate, reptile, and amphibian species. These skill sets allow us to efficiently obtain regulatory approvals under the applicable regulatory requirements. OA permitted more than 85 linear miles of access road improvements, all without the need for issuance of a permit ("no take" determinations) on behalf of a major utility from 2009 through 2014.

OA also obtained full approvals for a mountain, 9 MW wind generation project on a site supporting 23 State-Listed plants and animals in Massachusetts. We have also provided consulting services for numerous solar projects within rare species habitat including various rare amphibians, reptiles, and plants.

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**Amphibians and Reptiles**

OA's experience working with a wide range of reptiles and amphibians that are associated with unique habitat features enables us to provide our clients with realistic expectations and creative solutions, whether dealing with mountain ridges inhabited by timber rattlesnakes (*Crotalus horridus*) or diamondback terrapins (*Malaclemys t. terrapin*) within coastal rivers, salt marsh creeks, and shorelines.

OA was the lead biological consultant on the oversight and monitoring of the construction of specialized amphibian habitat for the Norumbega Reservoir Covered Storage Tank Project, Weston, MA. This project was the first of its kind in Massachusetts and required a Regulatory Variance from the Massachusetts DEP. Our work included using drift fences to collect data on pre-construction amphibian community, collecting baseline data on amphibian communities at nearby reference (control) ponds, overseeing the construction of a new seasonal pond (vernal pool), importing amphibian eggs and invertebrates to the new pond, and monitoring the new pond and reference ponds for two seasons following construction. The project resulted in the establishment breeding populations of four amphibian species and a diverse community of invertebrates within the created habitat.

We completed a multi-year mortality avoidance plan for eastern box turtles (*Terrapene c. carolina*) at the New Bedford Airport (MA) in association with runway and approach improvements at the facility. This work also included construction oversight for 3 years during construction of new turtle nesting areas as mitigation (3 areas, 2-5 acres each) and periodic telemetric monitoring of 25-30 eastern box turtles that were equipped with radio-transmitters.

We provided field studies and permitting services for two solar arrays within habitat for eastern box turtle and several state-listed moth species in the SouthCoast area of Massachusetts.

OA has conducted surveys for eastern worm snakes (*Carphophis amoenus*) and eastern box turtles for a utility project involving construction of a new substation in western MA. Our survey methods and level of effort was approved by the NHESP and we were able to confirm that worm snakes would not be impacted. Similarly, OA developed an eastern box turtle protection plan (including radio-telemetry tracking of turtles) that was approved by the NHESP and completed late 2015.

**Invertebrates**

OA staff also has extensive experience working with rare invertebrates. Whereas many rare invertebrates require specific host plants, we often conduct botanical surveys targeting host plants to determine the likelihood of habitat for rare invertebrates. Some of these projects are relatively acute, requiring preliminary research of ecological requirements of the targeted rare species, followed by limited hours in the field assessing the botanical community and identifying areas containing specific larval host plant species.

As an example of a smaller scale project, OA conducted a habitat assessment for two rare moths at a proposed solar site in Chicopee, MA. At this property two state-listed moth species had been documented to occur near the project site. OA conducted an assessment of the vegetation cover in and around the work area and reviewed the

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scientific literature in reference to these species' habitat requirements and submitted a habitat assessment and impact analysis to the NHESP. The project was approved with a vegetative management plan that will maintain a diverse community of dense herbaceous groundcover.

In a more complicated project involving 14 state-listed invertebrates (1 beetle and 13 moths) at a 54-acre property in Edgartown, MA, OA conducted site inspections, literature reviews, prepared a habitat assessment and impact analysis, and negotiated with the NHESP. We obtained a Conservation and Management Permit for the residential, bayside subdivision, now under construction.

In other projects, we have conducted extensive field searches for rare aquatic invertebrates such as the coastal amphipod (*Synurella chamberlaini*). This species only occurs in two municipalities of MA and one of the known populations is on a municipal property used for air transportation. OA was responsible for implementing a monitoring plan using standardized sampling.

**Botanical**

OA has conducted vegetation cover type mapping throughout much of New England and has performed species specific botanical surveys within a wide variety of habitats. OA has experience working with dozens of regionally rare plants and has a library of technical botanical keys including the most recent publications on regional plant taxa.

OA conducted seasonal surveys for climbing fern (*Lygodium palmatum*) throughout a 97 acre parcel with two intersecting electric transmission ROWs that was being evaluated for equipment upgrades, reconductoring, and construction of a new substation. We found over 100 patches of climbing fern and developed a plant avoidance plan including monitoring and post-construction evaluations. Our plan was approved by NHESP and construction is now complete.

OA conducted an emergency, out-of-season review and survey for an endangered plant species and prepared a Conservation and Management Permit for the benefit of the Town of Aquinnah in 2015 to allow the planned displacement of the historic Gay Head Lighthouse to proceed within the preferred schedule.

OA conducted field surveys for two rare plants [New England Blazing Star (*Liatris noveae-angliae*) and bushy rock-rose (*Crocantemum dumosum*); for an electric transmission line project in Barnstable, MA requiring an increase in ground-to-conductor separation. Some of the plants occurred within an area targeted for earth excavation and grading. OA prepared a mitigation plan and a transplant protocol, worked with engineers and construction managers to develop a construction methodology, implemented the mitigation plan to avoid known specimen locations wherever possible, and transplanted specimens from within the work area. This plan included close oversight by OA's botanical specialist, with monitoring for rare plant survival/condition and invasive plants. The NHESP-approved transplant work was completed in late 2012 and monitoring was completed in 2016 in accordance with the permit.

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**Abbreviated Client List (not necessarily included above)**

Holyoke Gas & Electric Dept., other confidential, regional natural gas and electric clients, NextSun Energy, SunBug Solar, Framingham Conservation Commission, Acton Natural Resources Dept., Friends of the Herring River (Wellfleet), Pioneer Valley Energy Center, A. Duie Pyle, The Berkshire School, US Army Corps of Engineers, US Fish and Wildlife Service, MA Division of Fisheries and Wildlife, MASS DCR, Massport/ Logan Int. Airport, New Bedford Regional Airport, Barnstable Airport, Dept. of the Army, Onset Water and Fire District, Borrego Solar, Melink Corp, TRC Solutions, Tighe & Bond, Epsilon Associates, Inc. , VHB, Inc., BSC, Inc., Grafton& Upton Railroad, City of Quincy, Manchester Sand & Gravel, as well as numerous other commercial, residential and municipal clients.