

**Deborah Brosnan
& Associates**
Science-Based Environmental Solutions Globally

Twenty-five years experience in reducing risk and successfully crafting science-based solutions in all areas of the environment (endangered species, land-and coastal-zone use, restoration, natural resource and energy), disaster risk management, sustainability and resilience.



Deborah Brosnan & Associates solves problems. We reduce risks for discerning clients, governments and communities in the USA and worldwide. We have an independently validated and proven ability to mobilize the best scientific and technical expertise, target the real problems, and find lasting solutions that sustain resources and save clients' money and time. We are experienced working with major environmental laws, policies and regulations. Our core network of top scientists allows us to rapidly deploy and design solutions to pressing issues and crises. We thrive on finding solutions in high-stake and high-conflict situations.

Service Categories: Key Examples

Evaluation and Due-Diligence for Decisions

- Energy and Technology Evaluation for Investors
- Colorado Wetlands for land acquisition actions.
- Atlantic Salmon Hatchery

Science Arbitration (complex and litigated issues)

- S. Florida Everglades Restoration
- Missouri River Biological Opinion
- Columbia River Dredging

Master Environmental Planning

- Environmental Design and Planning for Several Developments
- Siting Energy Pipeline Mooring, Evaluation & Mitigation of Environmental Risks
- Site Evaluation and Mitigation to Preserve Beaches for Island Development

Disaster Risk Management and Climate Adaptation

- Mitigating Sea Level Rise in Virginia USA
- California State Tsunami Risks and Planning
- Colorado Floods Assessment

Deborah Brosnan serves as a trusted advisor and a resource that is focused on solutions, delivers high value for investment, has saved clients tens of thousands of dollars in drawn out litigation, conflicts and poor-decisions, and while helping to sustain the natural world, its resources and those who depend on them.



**Deborah Brosnan
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Projects Short Summaries**

EVALUATION AND DUE DILLIGENCE



Energy Technology Evaluation for Investors. Several clients are exploring investing in alternative energy projects. They've requested our help in evaluating the soundness of the underlying science and technology and/or in understanding the environmental risks and regulatory issues that are likely to affect them. We have been able to effectively assist them in both of these areas. CLIENTS Private clients/companies.



Colorado Wetlands for land acquisition We provided key biological assessments, valuation and assistance to group of Private Clients in Telluride Colorado in their efforts to conserve and purchase a major wetland complex (1k acres). In addition we identified issues that helped them to avoid major contaminant-related pitfalls. We charted a course that was successfully implemented. In this project we managed 32 scientists and liaison with government, stakeholders, attorneys, and media. CLIENTS Several private clients.



Atlantic Salmon Hatcheries and Recovery. The State of Maine in cooperation with the NOAA requested our review of their hatchery science and practices for the Atlantic salmon because populations were declining. All attention centered on the adequacy of hatchery practices. When we started, many were resigned to a solution of investing millions more dollars in new hatcheries. Having first assessed the issues, we identified and assembled an expert team for site visits and to meet with all stakeholders. Our review team consisted of experts in hatchery practices, biology and genetics, and oceanography. The expert team found that the hatchery practices were exemplary and excellent. The issues were related to river conditions and the oceans where salmon spend most of their lives. We were able to provide a list of actions that would improve the river conditions for salmon, and show how to evaluate the role of the marine factors. Importantly we helped to save the State from needlessly investing millions of dollars, which it could not afford, on more hatcheries, as these were not the cause of the problem. CLIENT- STATE OF MAINE.

SCIENCE ARBITRATION



Columbia River Dredging. An eleven-year litigation had no end in sight. At odds were the Corps of Engineers, National Marine Fisheries, the Ports of Portland and Vancouver, State governments of Washington and Oregon and environmental groups over whether to dredge 103 miles of Columbia River an extra 3 feet. The extra depth was needed to accommodate the larger commercial vessels without which the region would lose millions in income and jobs. Environmentalists argued that dredging would lead to the extinction of at least 7 endangered salmon species. NFMS had concurred issuing a jeopardy opinion in its BiOp. The parties asked for our help. We mobilized our process of assessment, engagement of experts, trust-building, and designing the right process for the problem. That included three public meetings with the science panels. Through our expert science arbitration process we were able to navigate the issues, deal with unexpected challenges, and reach solution. The panel concluded that there was high certainty in the science and low risk to the species from dredging. They also provided guidelines, for actions that would aid recovery of species. All parties including the environmental groups concurred, the NMF gave permission, lifting the jeopardy opinion. The project moved forward without adverse impact to salmon and with improved recovery measures in place, and provided positive economic boost impact to the region. We resolved this 11-year problem in less than 12-months. CLIENT US Army Corps of Engineers in cooperation with NMFS and Ports.





California Redwoods When a private Redwoods Lumbar Company was purchased, the new owners attempted to raise revenues and profits by increasing logging. However, they had not appreciated in advance the environmental regulations including those governing the endangered species living in the forests or the high degree of environmental interest. Almost immediately they were in major crisis over endangered species, Litigation mushroomed, regulatory violations increased, and tree-sitters and protesters soon moved in. They sought our help on the marbled murrelet, an endangered bird. Using our process and experts our team was able to build bridges between the company, governments, and stakeholders. The company, the government and the environmental groups accepted our scientific analyses and solution for the endangered species. While other issues were litigated our solution was not challenged. Later when the company decided to sell portions of its land to the Government in a comprehensive agreement, our analysis was pivotal in ensuring a fair deal for the company and for nature. CLIENT- Corporate Client.

MASTER ENVIRONMENTAL PLANNING



Environmental Design and Planning for Several Developments Developer clients are often looking to create unique projects that meet the needs of investors, clients/purchasers, and that leverage the beauty and ecological services provided by the natural surroundings. We have carried out assessment of habitats and species, created unique master environmental designs, successfully navigated issues of green certifications, endangered species, habitat recovery and zoning, and government permitting for our clients. We have turned apparent challenges and negatives into award winning positives .CLIENTS Companies and private clients including designing

for “whole-island” projects.



Siteing Energy, Pipeline Mooring, Evaluation & Mitigation of Environmental Risks

A client, a major energy company sought ways to improve fuel delivery to reduce costs and minimize environmental and tourism risks. We conducted a thorough environmental feasibility assessment, site location analysis, and assessment of stakeholder environmental concerns, We developed a framework for evaluating risk that allowed the client, stakeholders and government to see the proposed project in a broader light and that engaged all parties effectively. CLIENTS Company



Site Evaluation and Mitigation to Preserve Beaches for Island Development

Developers, private clients and existing developments have sought our assistance in solving their issues of beach preservation and reducing their vulnerability to loss and damage. We have conducted site evaluations, hydrodynamic models and forecasting, developed solutions that have ranged from ecological to engineered and hybrid ones, engaged government and stakeholders, swiftly secured planning and most importantly for our clients helped to implement those solutions successfully. CLIENTS Numerous development and private clients. Island Governments

DISASTER RISK MANAGEMENT AND CLIMATE ADAPTATION



California State Tsunami Risk and Planning At the request of USGS we engaged in analysis, and disaster risk management for the Strategic Science Team evaluating the potential effects of a major tsunami, (one that is likely to occur) on California’s coastal zone, We led the effort for ports, fisheries, natural resources ecosystems and endangered species. We worked with six different teams of experts and met with stakeholders to develop response and planning. CLIENT US Geological Survey





Assessing and Translating Risks from Sea Level Rise Many coastal communities, particularly those on the eastern seaboard are exposed and vulnerable from rising sea level and the associated higher inundation during storms. Natural habitats, essential infrastructure and services, commerce and the cultural ties of communities to their sense of place are all threatened. Working with our clients NASA and The Nature Conservancy and teams of modeling scientists we have been helping to develop innovative tools and applications that will allow for better forecasting of impacts and visualizations. We have designed a science-translation process that we will use to engage with stakeholders from all sectors (from government to private) assisting them to use the tools and information in their decision-making. CLIENTS The Nature Conservancy and NASA (with a wider target audience). We have conducted other similar projects for e.g. UNEP, European Union, Organization of Eastern Caribbean States, private landowners and developers



Colorado Flood Assessment Following the devastating Colorado floods in 2013 we were asked to evaluate the ecological and environmental effects of the floods and address the environmental-human interactions. We conducted intensive site visits immediately following the floods. We assessed impacts on landscape, endangered species and restoration zones as well as mobilization of contaminants during the flood. CLIENT Natural Hazard Center Colorado.



Volcanic Eruption Mitigation The British island of Montserrat faced a difficult choice. To build a new port and settlement in a pristine location, or to risk that a volcanic eruption would destroy its main city, port and airport, leaving the island helpless and cut-off. Building a port could potentially destroy the fishing and tourism coral reefs on which the economy and individual lives were almost wholly dependent upon. We were asked for help in finding a solution. We worked with the government and NGO community to first establish a local stakeholder team. Our scientists carried out essential biological assessments and reported on their findings. Based on the scientific conclusions we were able to identify the risks and consequences of different scenarios. We engaged with the stakeholders, government, and with an engineering firm using our science to shape solutions that would meet their needs. We helped to develop a unique jetty design that would ensure that vital habitats were protected. As part of the effort, we “moved” and restored a coral reef that was at risk during construction. Within 24 hours of relocation hundreds of small fish had taken up residence on the new coral heads. We used the opportunity to train local people in science and field monitoring. Shortly after the completion of the project, the volcano erupted violently. As had been feared, the main town, original port, and the airport were buried under ash and destroyed. The new port, that we helped create, was the only access. It has continued to serve the needs of the people and the reefs have continued to thrive providing food, dive sites, biodiversity, and tourism services. CLIENT British Government, Montserrat Government.



Deborah Brosnan & Associates
FEATURED PROJECT

Scientific Arbitration (complex and litigation) SOUTH FLORIDA EVERGLADES RESTORATION
Client: Department of Interior and South Florida Task Force.



The Dept. of Interior requested our help to resolve the impasse over endangered species and S. Florida Everglades ecosystem restoration. Restoration was stymied and several endangered species were pitted against each other. Opinions were bitterly divided and distrust was high. Different interest groups charged that the Service was favoring selected endangered birds at the expense of others. The issues were already in litigation; several lawsuits had been filed and more were pending. Initially the Service requested that we convene panel of avian experts. We worked with the Service and South Florida (SF) Taskforce to drill down on the issues and create clarity in identifying their underlying

problems and questions. It became apparent that understanding habitat dynamics and hydrology were critical to evaluating the endangered species issues and answering the concerns of all stakeholders. With the USFWS and the SF Task Force agreement we added the required expertise to our expert scientific panel. This provided a better, more comprehensive and useful review.

A critical part of the success in the project was Dr. Brosnan's upfront investment in reaching out to all the parties in order to build trust in the process. She worked intensively with each group to ensure that she knew their issues, that they felt their voices were heard and concerns addressed. As a direct result, the parties showed up to public meetings as active participants in a more cooperative process. Investing in laying the groundwork to refine the questions, assemble the right experts, build cooperation and bring people together on the core issues, even when they have diverging opinions are central to many of our projects. In the Everglades we were able to reframe the debate away from pitting species and interests against each other to one of managing species and habitats, and stakeholder needs through transition. Our expert panel developed a set of priority actions that could be (and were) undertaken by the Service and SF Task Force and that resolved the impasse. For instance, the panel found that the apparent conflicts among the species were short-term and could be resolved by managing the transition process more effectively. In a major agreement the regulating agencies recognized that changes in abundance of endangered species were to be expected in differing habitats during transition and that issuing a jeopardy call under ESA (BiOp) would not always be warranted in these circumstances. This proved important to the stakeholders and other government entities, as a previous jeopardy opinion had stalled the water-flow restoration and created mistrust and litigation.

Through our experts and process we were able to provide the parties with specific short term actions that could be incorporated at no cost into existing efforts and monitoring, We were also able to outline an action plan for gathering information going forward, and for helping species through the transition to full restoration. For instance, the scientists concluded that developing a translocation plan now to relocate critically endangered populations would help to secure recovery and prevent extinction. By carrying out the work now it would provide greater insurance and avoid problems later. The Service and SF Task Force incorporated all of our recommendations and the restoration has moved forward. This included the raising of the Tamiami Trail (E-W highway through the Everglades) to allow for more normal and historic water flow from Lake Okeechobee area in the north, through the Everglades National Park, and to Florida Bay- a step deemed critical for the survival of the Everglades and its species.

When new information emerged on other Everglades issues, the Service continued to request our re-engagement to review and incorporate the knowledge. We carried out two additional and successful scientific reviews for them.



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FEATURED PROJECT

Assessment and Science Arbitration. MISSOURI RIVER
Client: US Army Corps of Engineers. Yankton SD Office



We were originally contacted by the USACE who in cooperation with the USFWS, Missouri Dept. of Conservation, Nebraska Game and Parks Commission, US Geological Service University of Missouri and with input from South Dakota, Iowa and Kansas requested that we conduct several independent scientific evaluations.

We initially analyzed and reviewed three programs in the USACE's efforts to restore the Missouri River Ecosystem and comply with the Biological Opinion (BiOp). Our reviews and assistance were focused on Population Assessment Programs; Adaptive management; Habitat Assessment and Monitoring Programs; Hydrological Models and the Biological data linked to those models.

We assembled a first team of six scientists who comprised the range of skills necessary to address the complex issues affecting species, their relationship to habitats and the extensive river management programs that had changed the flow and navigation regimes along the length of the Missouri River. As our assessment involving endangered species progressed it became obvious that the agency groups needed statistical support in the development of adequate monitoring and analysis techniques in order to comply with the Biological Opinion (BiOp). We secured that support developing a rigorous program and the appropriate training for the federal and state agency staff. Subsequently, we recognized that a Population Viability Analysis would help to resolve management issues regarding the actions necessary for the endangered pallid sturgeon. We secured the leading academic scientist to complete this analysis and were able to resolve the outstanding questions. The management of the Missouri River rested on an adaptive management program. However our review found that the management program was inadequately designed. It lacked a conceptual framework and consequently did not have any acceptable standards of scientific rigor. There were no reliable means to distinguish between irreversible changes and transitions or opportunities for better management and progress towards goals. Our lead Dr. Brosnan engaged Dr. Jim Quinn (quantitative ecologist and professor at the Information Center for the Environment at UC Davis) and together they developed an adaptive management framework and plan for the program. The parties adopted the framework and plan.

Testimony to the value of our work, our assistance was sought in several subsequent Missouri River environmental issues. That included a request from the USGS to review their Missouri River Biological Research Program and Regional Laboratory.

