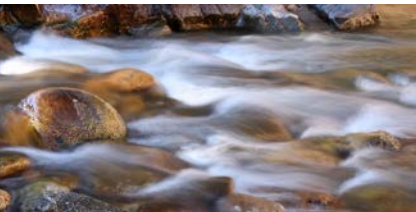
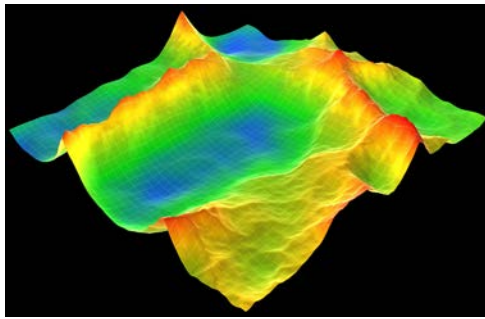
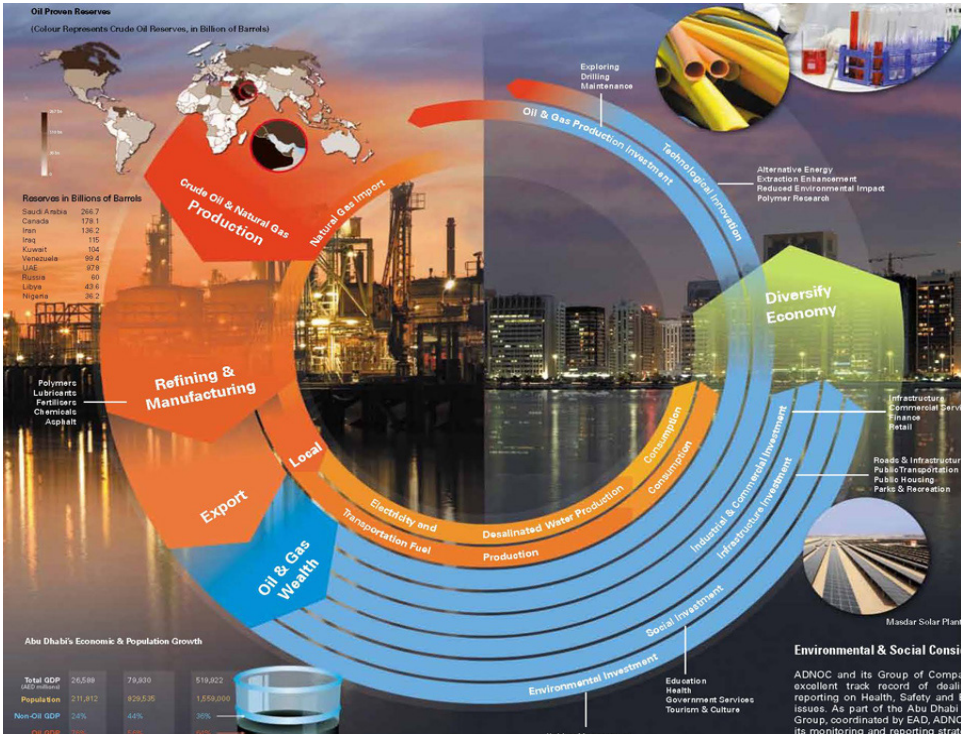
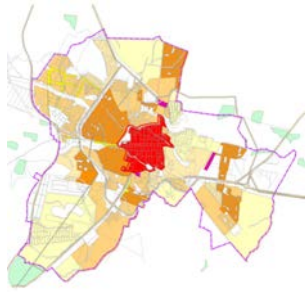
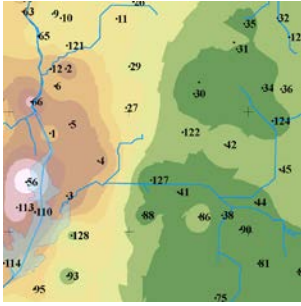


ECOSYSTEM SCIENCES

Science | Design | Planning







STATEMENT OF QUALIFICATIONS

ECOSYSTEM SCIENCE, LLC

Science | Design | Planning

202 N. 9th Suite 400 Boise, ID 83702

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www.ecosystemsciences.com

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▲ Ecosystem Sciences work includes projects throughout North America and internationally with a focus on the Pacific Northwest of the United States, and significant expertise in Idaho and the Intermountain West.

PROFILE



Ecosystem Sciences is a respected scientific, environmental design and planning firm located in Boise, Idaho. Established in 1994, our firm has built a reputation for mastering challenges and providing the best knowledge, science, and design for our clients' needs while promoting a sustainable environment. We create balanced approaches for resource management, environmental investigations, and ecologically based designs.

The value we bring to our clients and their challenges is environmental solutions that work. Our philosophy, culture, and technical expertise are what define us as a company, are why we are leaders in water and land planning, ecological investigations, stream restoration, and environmental design, and why we enjoy longstanding relationships with many of our clients.

We have worked on some of the most important environmental, planning, and restoration projects in the Western U.S., and in many areas of the world. Our ability to solve environmental planning and restoration challenges, along with the confidence others have in us to do so, have brought us unique opportunities and project complexities. Our work ranges from large basin-wide and landscape-scale projects to distinctive, carefully crafted smaller site specific projects.

Our environmental services are provided by a diverse team of environmental planners, scientists, and designers, who offer innovative, balanced, and objective solutions to the complex environmental and social issues of today and tomorrow. We understand the unique environmental opportunities and challenges presented by each project, and tailor our deliverables to meet the needs of individual clients. Services include water and stream systems planning and design; environmental planning and assessment; natural resources management; ecological design; wetland delineations; water rights consulting; GIS; cartography; mapping and analysis; resilient environmental design; visual resource analysis; and data visualization.

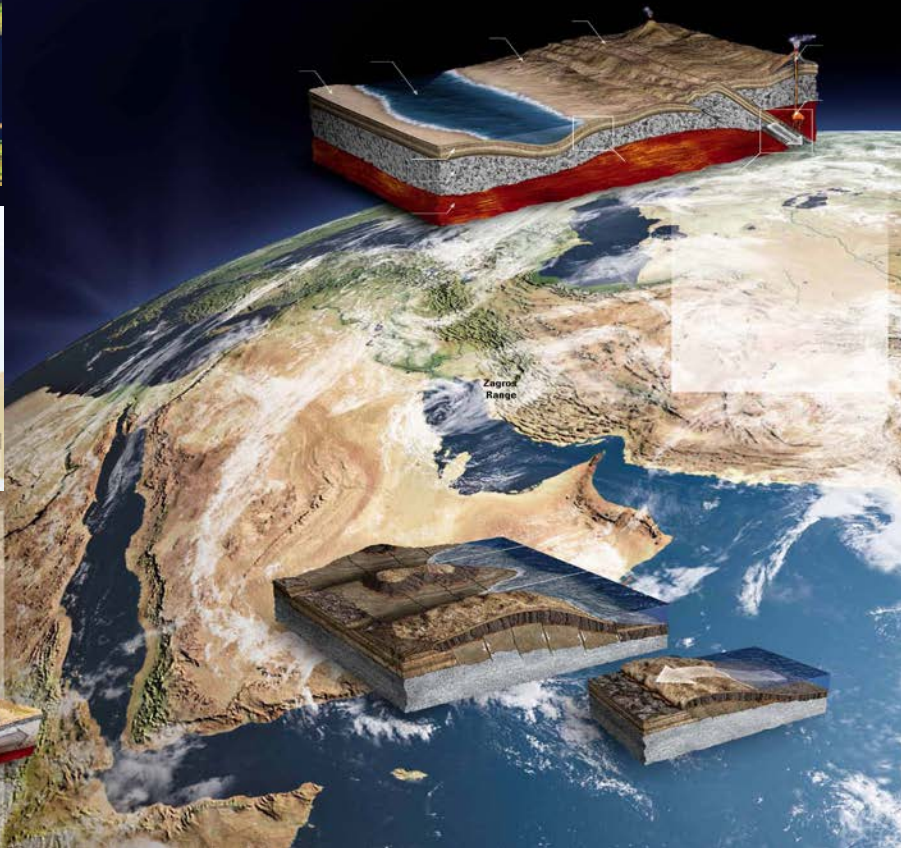
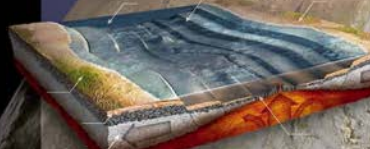
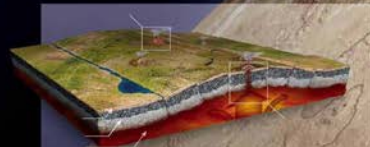
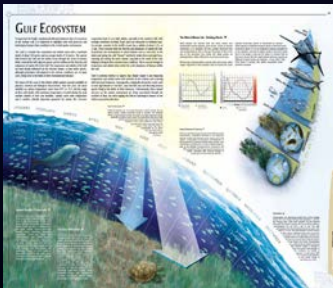


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SERVICES



Ecosystem Sciences uses sound science coupled with innovative design and state of the art technology on each project. Our services are provided within a carefully developed and maintained framework of client relationship, innovation and operational excellence. This enables us to act as trusted advisors, to push the limits of creativity, and to deliver consistently high levels of performance.

Environmental Planning

- Watershed planning and analyses
- Riverine system planning and modeling
- Wetland Delineation and Permitting
- Geographic information systems
- Land management and planning
- Public and stakeholder involvement
- Recreation planning and analysis
- Regenerative planning and sustainability
- Water resources planning and analysis
- Water Rights Analysis and Consultation
- Water sensitive urban design

Natural Resources

- Aquatic sciences and fisheries
- Biological resources
- Ecosystem and habitat restoration
- Natural resources conservation and management

Environmental Impact Assessment + Sciences

- Environmental compliance monitoring
- Environmental impact assessment and sciences
- Natural resources
- Permit strategies and acquisition
- Visual, landscape analyses and simulations
- Cartography and data visualizations



Environmental Inventories, Assessments, Reporting and Documentation

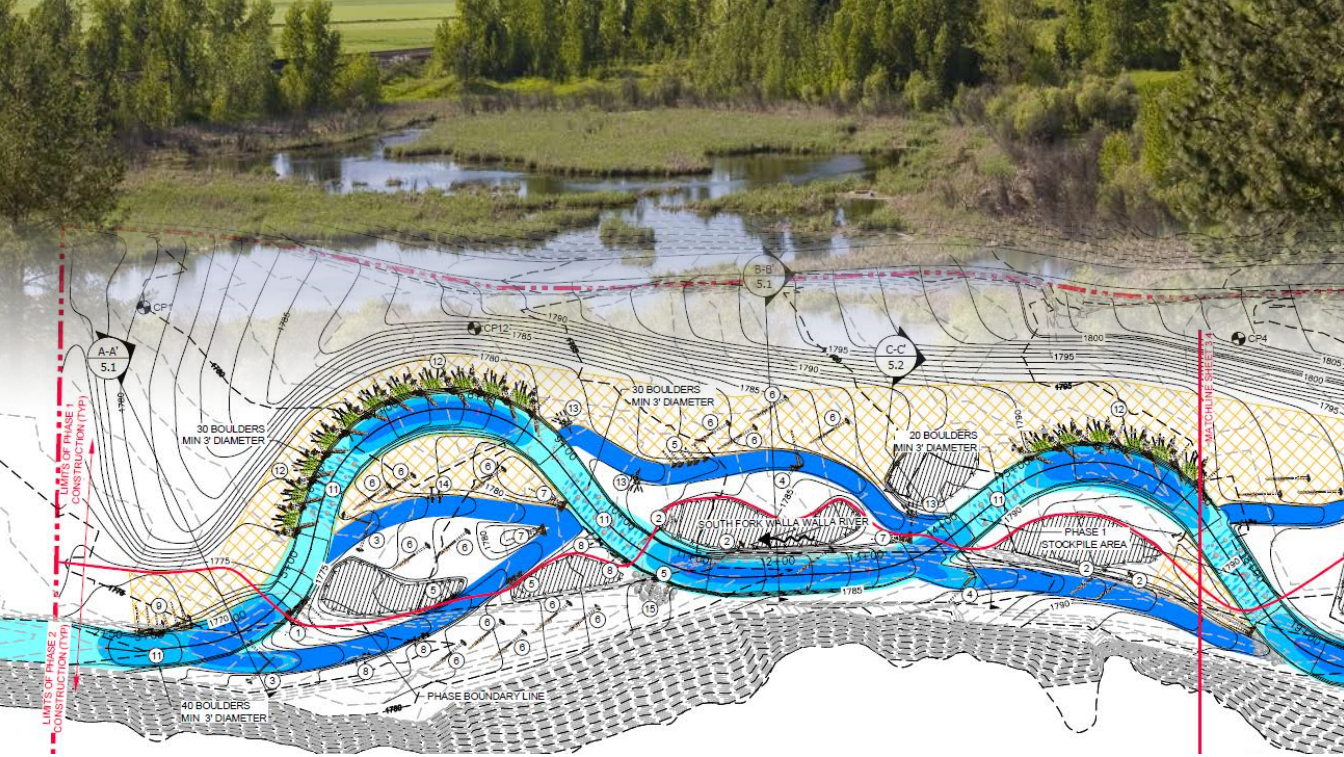
We excel in value-added services that enhance our clients business, financial, regulatory compliance, and technical decisions.

Environmental site assessments are designed to identify potential signs and indications of environmental liabilities. The assessments are often designed in phases so that a client can choose whether to proceed from a cursory review to more detailed research or even sampling. In many cases, a cursory review is sufficient. In others, more detailed work may be recommended. By phasing the assessment, a client can rethink plans along the way without committing to incur maximum expenses.

Services include:

- Biological, cultural, and natural resources management
- Environmental Impact Statements (EIS)
- Environmental Assessments (EA)
- National Environmental Policy Act (NEPA) compliance
- Wetlands assessments and delineations
- Conservation and planning
- Geographic Information Systems (GIS) and remote sensing
- Threatened and endangered species surveys
- Stormwater Design and Management
- Environmental and ecological risk assessments
- Habitat Conservation Plans
- Ecological, Habitat, Species and Landscape Modeling
- Monitoring for Biological, Habitat, and Aquatic Systems
- Data Analysis, Statistics, Modeling and Optimization
- Water Quality Monitoring and Analysis
- Fisheries, Riverine and Wildlife Studies
- Landscape Ecology, Design and Planning





Wetland Delineation and Permitting

Wetlands are defined as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. We can provide a full wetland and waters delineation as outlined by the US Army Corps of Engineers. Our involvement early in the planning and development process can ensure your project complies with all local, state, and federal requirements. Our delineations result in a jurisdictional determination approval by the US Army Corps of Engineers. This approval confirms the location of wetlands and streams on the property and allows for us to plan your development to avoid these regulated features or to assist in preparing the necessary permits for any impacts. This is a critical step to avoid any potential violations, which could result in large monetary fines and lengthy delays to the project. Our services include:

- Preliminary Wetland Evaluations
- Wetlands and Waters of the U.S. Delineations
- Jurisdictional Determinations
- Stream Assessments and Classifications
- Wetland and Stream Impact Assessments
- Ordinary High Water Mark Assessments
- Threatened and Endangered Species Studies
- Habitat Evaluations
- Wetland and Stream Mitigation Banking
- Construction Monitoring and Administration
- Regulatory Permitting
- Compliance Monitoring
- After-the-Fact Regulatory Permits
- Existing Vegetation Surveys
- Protect, restore, and maintain habitat and open space
- Optimize water-based recreational opportunities

Water Rights Consulting

Virtually all water projects contain issues concerning water rights. Water rights are the core of development in the West. In Idaho, the ongoing basin adjudications and administrative actions has revealed the complexities of water rights as well and the disputes that continually arise over water issues. Every water right transaction requires hydrologic analysis to ensure that state laws are not violated and owner rights are protected. Ecosystem Sciences has extensive expertise analyzing water right transactions, and has a close working relationship with the Idaho Department of Water Resources, the agency which administers water rights throughout Idaho. Ecosystem Sciences also works closely with many legal firms offering water law support services. Some of the services Ecosystem Sciences offers are listed below:

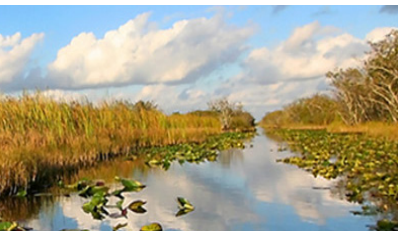
- Hydrologic analysis for water right transfers and permits
- Preparation of documents and applications for water right transactions
- GIS mapping of water rights and evaluation of water right use/non-use
- Development of mitigation programs
- Coordination with IDWR and legal consultants
- Professional expert testimony for water right disputes

Groundwater Studies

Throughout the western states, groundwater supplies a significant percentage of irrigation and other water supplies. Characterizing and predicting the behavior of these aquifers is becoming extremely important with increasing development of the resource. Ecosystem Sciences is continuing the tradition of groundwater analysis by utilizing new groundwater models and implementing existing models to predict the behavior of aquifers under various conditions. Some of the services Ecosystem Sciences offers are listed below:

- Surface water / groundwater interactions
- Well testing and reporting
- Water quality sampling programs
- Mitigation program design
- Groundwater Management Planning





Ecosystem and Watershed Sciences

Naturally functioning ecosystems are the outcome of the evolution of physical and biological interactions in a given region. Power production, flood control, agriculture, land development and urbanization are a few of the causes of disruption to the natural ecology that provides for modern society.

We identify the watershed-specific context, the limiting physical and biological conditions, the biological performance criteria, a prioritized suite of measures best suited to restore natural ecologic function, and a monitoring strategy to ensure the long-term achievement of management goals. The result is a recommendation for restoration that is tailored to the specific needs of the watershed and site, taking into account both historical and future conditions. Capitalizing on the diversity of our expertise and experience, our restoration projects incorporate watershed-scale understanding of the physical and biological context, natural recovery, habitat structure and diversity, and the specific needs of critical or endangered species.

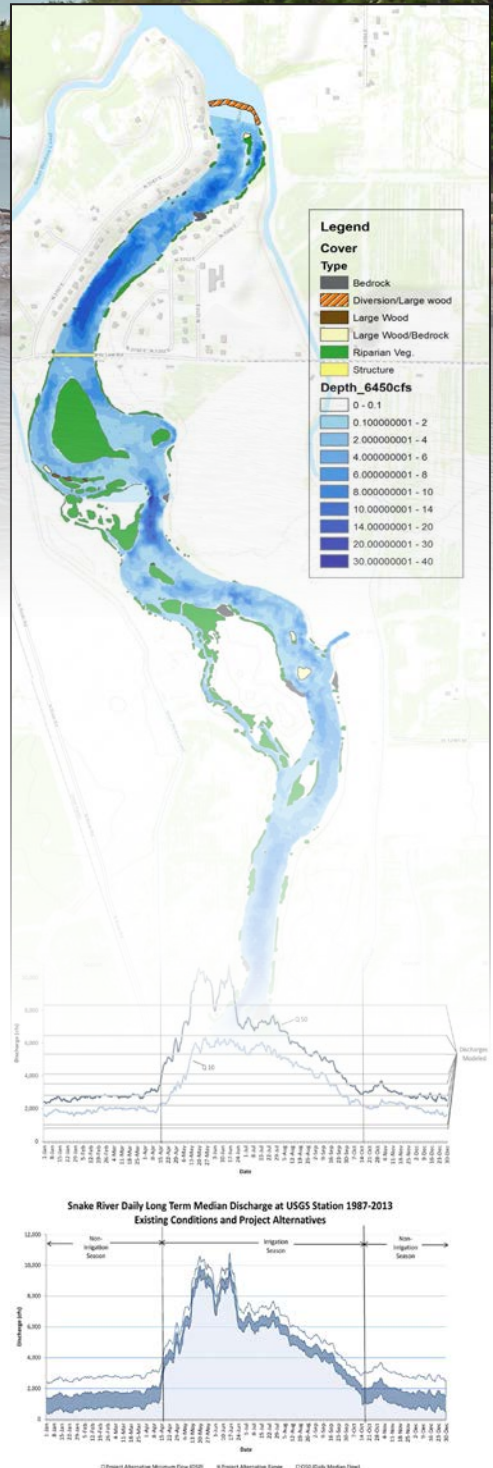
- Effectively obtain, manage, and assess water resources data and information
- Further the scientific and technical foundation of water management
- Develop and maintain a diverse mix of water resources
- Construct, operate, and maintain a reliable infrastructure system
- Reduce the negative effects on waterways and watershed health caused by hydromodification and flooding
- Effectively reduce sources of pollutants and environmental stressors
- Protect, restore, and maintain habitat and open space
- Optimize water-based recreational opportunities



Hydrologic Science

Hydrology, the science of predicting, characterizing, and managing water resources, plays an important part in nearly all water projects. Some projects require statistical and deterministic analyses to make the most of a limited supply, while others involve managing an excess of water. Through both research activities and practical experience, Ecosystem Sciences has an unmatched knowledge of the hydrology of the Western US. Some of the services Ecosystem Sciences offers are listed below:

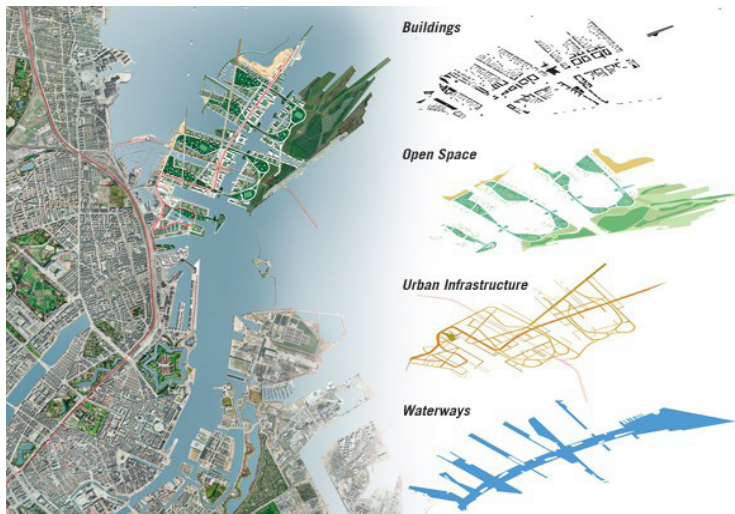
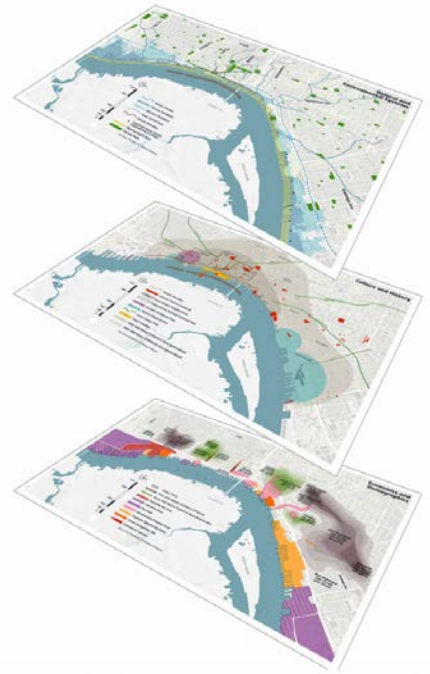
- Rainfall-runoff analyses
- Stormwater management
- Measuring System Design and Installation
- Instrumentation programs
- Snow hydrology
- Urban and small watershed hydrology
- Statistical analysis and risk assessment
- Flood frequency characterization
- HEC - Watershed runoff modeling
- HEC - Water surface profile modeling
- HECRAS – River analysis & floodplain mapping
- River network models
- ArcView – GIS Spatial Hydrology



Environmental Planning and Design

At Ecosystem Sciences we view the built environment, architecture, design and planning as elements inextricably tied to urban and rural ecosystems which make-up the watershed. Increasing urban development, threatened aquatic population levels, and ever-tightening budget constraints demand environmental planning efforts that are well designed and implemented. We employ a performance-based approach to process-based restoration planning and implementation that includes:

- Watershed and corridor planning (at various spatial scales and including limiting factor analyses)
- Improving stream network connectivity
- Improving habitat diversity and function
- Monitoring and evaluation with measurable success criteria and adaptive management
- Regenerative planning and systems integration
- Built environment impact analysis, mitigation, and integration with natural systems
- Stormwater modeling
- Daylighting and urban water course design

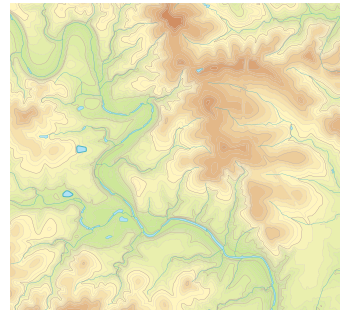


GIS: Database Systems, Analysis and Mapping

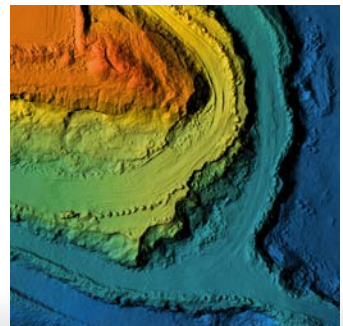
A picture is worth a thousand words and our mapping illustrates that concept. We develop mapping and databases using Geographic Information Systems (GIS). Our GIS projects enable the combination of potentially disparate data from various disciplines into a coherent picture, allowing planners to make informed decisions. We tailor our GIS databases and maps for each project to suit performance requirements. Consequently, our reports and data analysis are visually oriented, relying upon high-quality mapping to illustrate key points and conclusions. GIS techniques also provide landscape to site scale connectivity and allows us to maintain continuity and context throughout our environmental analysis and project work. We utilize ESRI's ArcGIS suite of programs to build and maintain comprehensive geospatial databases that advance the needs of our clients' current and future planning efforts. Ecosystem Sciences GIS Services include:



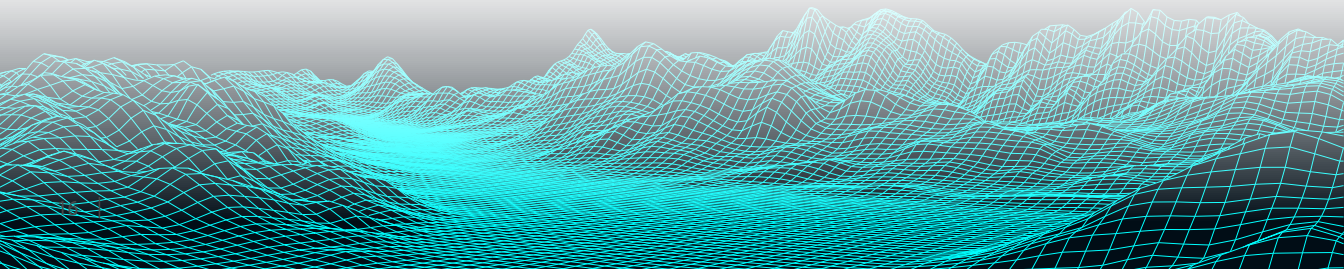
GIS Database Design & Development - efficient storage of GIS data requires the implementation of well-designed data models. We conduct project database design and development services. These services include initial database design, conceptual data modeling, physical data modeling, and database implementation.



GIS Data Conversion & Migration - essential to the implementation of any project GIS solution is high-quality data. If the data are bad, the decisions are bad. We have developed proven data acquisition, conversion and quality control processes that ensure that we deliver accurate and complete GIS data to our clients.



Spatial Analysis
Digital Photo Interpretation
Satellite Imaging, Acquisition and Analysis
3D Analysis and Modeling



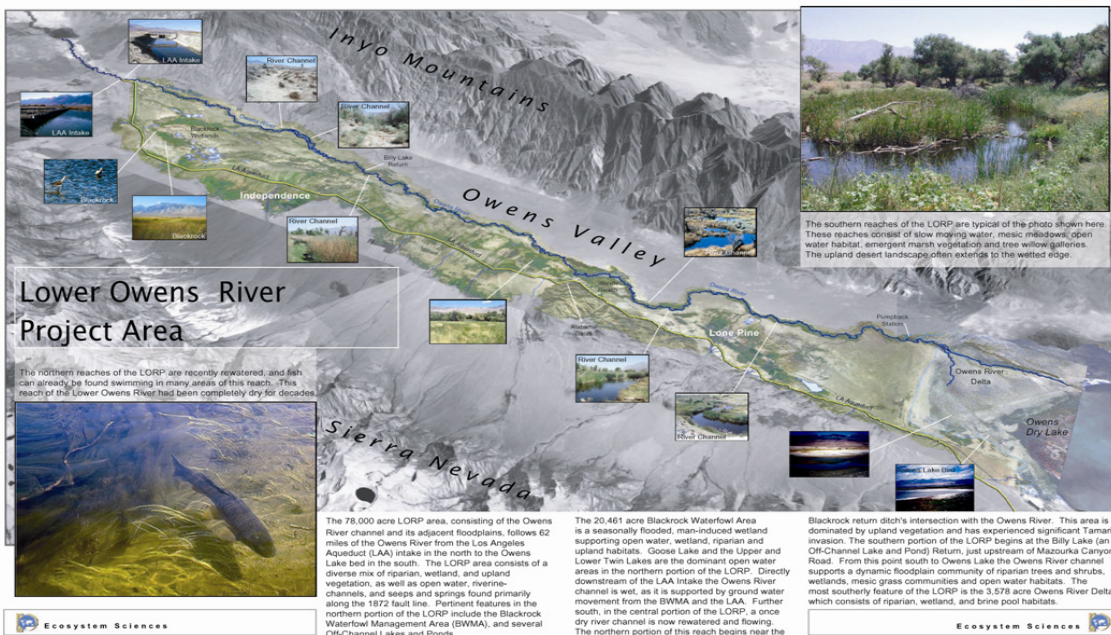
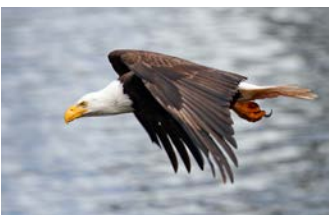
Fisheries and Wildlife Ecology, Habitat



Managing land and water use for fish and wildlife populations is integral toward sustainable use of a landscape's natural resources. Sustainable resource use is achieved through management plans that incorporate natural and built components. Our goal is not simply to identify negative environmental impacts, but to determine feasible mitigation for sustainable use of terrestrial and aquatic resources. Methods we utilize include an array of standardized and new techniques for modeling and management prescriptions.



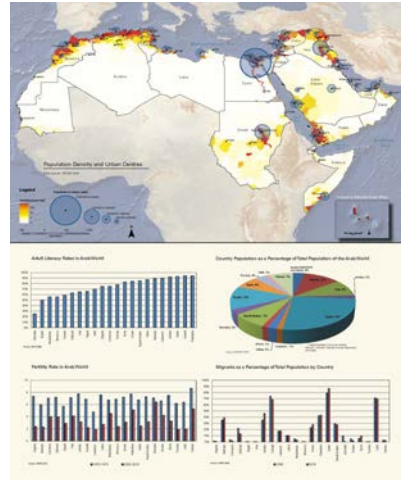
- Habitat use and viability
- Habitat/life-stage based models
- Rapid bio-assessment protocols
- Instream flow/habitat assessment
- Mapping of riparian and upland habitats
- Modeling of riparian-vegetation dynamics
- Revegetation, restoration, and habitat planning
- Habitat plan development and implementation
- Rare plant surveys and monitoring



Visualization, Graphics, Cartography, Atlases

Land use development, Architecture, Engineering, GeoTechnical, Environmental, Ecological and myriad additional data sets. Digital Cartographic Services including Custom Digital Maps & Graphics, 2D and 3D Data Modeling & 3D Visualization. Ecosystem Sciences utilizes geographic information systems (GIS), CAD, InDesign Suite and other computer applications for custom mapping, spatial analysis, spatial data base management, scientific and design visualization, information graphic, reports and atlas production.

- Quality digital cartography, graphics for publication, presentation, reporting
- Scientific / technical mapping and reporting
- Visualizations for planning and design
- 3D landscape modeling
- Maps for demographics, land use, planning, health, climate, natural hazards
- Base maps, topographic, cartograms, displays
- Cartographic visualization and atlases
- Mapping data conversion and data visualization



San Pedro River

Acquired by the U.S. Bureau of Land Management in 1987, the 56,000-acre San Pedro River Preserve is arguably the most successful modern-day conservation story in Arizona and throughout the West. The area is by no means pristine; by the late 19th century, an estimated 100,000 cattle grazed within the headwaters of the San Pedro River Valley. In recent decades, rapid growth and population increases in southern Arizona have caused concern for the river condition, and whether or not it can survive the extensive ground water pumping that now occurs in the area. However, the San Pedro River has been managed for restoration since 1987 and the current ecological condition demonstrates the marvelous capacity for riparian areas to recover over time.

San Pedro River

The San Pedro River is a north flowing river with its headwaters in the northern Mexican State of Sonora. It flows 140 miles north to its junction with the Colorado River in south-central Arizona. The San Pedro River is the only river never to be dammed in the southwestern United States. Extended lengths of the northern region of the river remain dry most of the year, relying heavily on the monsoon rains to generate water flow. The headwaters originate from the high slopes of the Sierra La Maricopa, Sierra San Jose, and Sierra Los Algos mountains in north-central Sonora, Mexico. Flowing northward, it passes through the rolling semi-arid grasslands of the Chihuahuan Desert and Sonoran Desert into Arizona, where it enters a broad valley flanked by mountains on the east and west.

The San Pedro River provides a very important riparian area for hundreds of species of plants, mammals, reptiles, insects, and birds. More than 300 species of birds, 200 species of butterflies, and 20 species of bats use this corridor as they migrate between South, Central and North America. In addition, the river is a flyway used as stopover habitat for an estimated 5-10 million migratory songbirds annually.

Beavers, through their dam-building efforts, have reduced the erosive power of the San Pedro over time. The resulting stair-stepping watercourse buffers the watershed during seasonal floods. Large pools spread the water outward, creating a network of wetlands that were effective in recharging the water table.

See the photo comparisons at the right to help understand the relationship between grazing and restoration.

Above: San Pedro River in 1882 before the removal of cattle in 1888. Below: 1988 photo from same location, after 10 years of rest from livestock grazing.

The rangelands were devastated and short of grasses by excessive grazing from horses and cows, and had lost its ability to hold soil in place with heavy rainfall. The once stable, slow-moving, marshy, perennial river transformed into an unstable, flood-prone, intermittent stream. Stream downcutting largely eliminated the wetlands, resulting in a lowering of the water table. In 1870, Arizona rancher H.C. Hooker described the San Pedro River Valley as "having an abundance of timber with large beds of sacton and grama grasses. The river bed was shallow and grassy ... its banks with luxuriant growth of vegetation." His description of the same area in 1900 told a different story: "The river had cut 10 to 40 feet below its banks with its trees and underbrush gone, with the mesas grazed by thousands of horses and cattle."

In 1988, the BLM instituted a 15-year grazing moratorium, eliminating the season long cow-calf regime of 6,500-13,000 animals. The rapid rate of vegetative recovery along the San Pedro has stunned even seasoned ecologists. Since 1988, 24 of the 47 bird species deemed to have a riparian affinity, have increased in population significantly, with only three species experiencing significant declines.

National Riparian Conservation Area

January 2006 Newsletter Number Two
Restoration Science

This leaf on the San Pedro river is largely excerpted from an essay by Tom Leskin, a hydrologist and biologist, and first appeared in *Tamara.org*

January 2006 Newsletter Number Two
Restoration Science

STATISTICS

- Watershed Area: 2,000 Square Miles (5,153,705 sq. ft. Arizona, 664,778 sq. ft. Mexico)
- River Flow: Low: 0.00 cfs; Avg: 85 cfs; High: 1200 cfs
- Beaver Length: 140 Miles

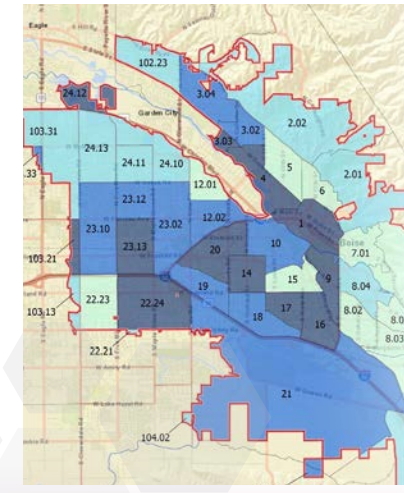
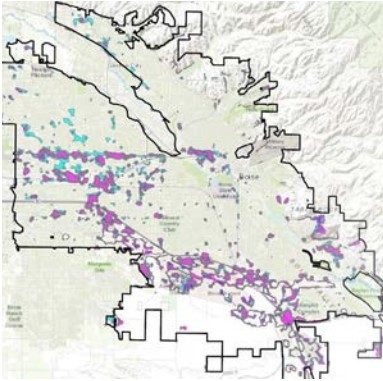
Environmental Characteristics:
Beaver forms include: diversions, meadows, oak woodlot savannas, meadows, woodlands, riparian forest, wetlands forest, and agriculture. Some oak and Chihuahuan desert oakscrub.

Restoration Managers and Land Owners:
20% BLM, 75% Private Land Owners

Urban Environmental Database, Analysis, and Natural Capital Assessments

Database management and Geographical Information Systems (GIS) have become indispensable in environmental, social and natural resource management for spatial analysis and data visualization. Ecosystem Sciences has been designing, developing, and maintaining large geospatial datasets as an integral part of our project work for climate assessments, social and environmental justice, and natural capital assessments.

- Effectively obtain, manage, and assess resources data and information
- Identify/create baseline data and compare locations with respect to environmental justice, equity, and health metrics
- Prioritize the strategic interventions that are required to provide environmentally safe places and equitable services
- Complex spatial and statistical analysis
- Spatial and temporal 3-D visualizations and illustrations
- Natural capital economic analyses; Valuing natural capital to account for nature's role in the economy and human well-being





KEY PROFESSIONALS

Our environmental services are provided by a diverse team of scientists, environmental planners, and designers who offer innovative, balanced, and objective solutions to the complex environmental and social issues of today and tomorrow. We understand the unique environmental opportunities and challenges presented by each project, and tailor our deliverables to meet the needs of individual clients.

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Clients

United States Forest Service
National Park Service
US Environmental Protection Agency
US Fish and Wildlife Service
Idaho Department of Water Resources
Bureau of Land Management
The Nature Conservancy
Idaho Department of Environmental Quality
South Valley Groundwater District, ID
Galena Groundwater District, ID
US Army Corps of Engineers
California Water Commissioners
California State Water Resource Control Board
California Department of Fish and Game
Idaho Department of Fish and Game
Shoshone-Bannock Tribes
Confederated Tribes of the Umatilla Indian Resv
ESRI, Inc
United Nations Environmental Programme
Idaho Army National Guard
Ada County Highway District, ID
Idaho Power, ID
Los Angeles Department of Water and Power, CA
Bonneville Power Administration
Seattle City Light, WA
El Dorado Irrigation District, CA
Nevada Irrigation District, CA
Placer County Water Agency, CA
El Dorado County Water Agency, CA
The Land Group, ID
Blaine County, ID
Twin Lakes Canal Company, ID
CHSQA Architect and Engineers, ID
Barker Rosholt & Simpson LLP, ID
Givens Pursley LLP, ID
Pinnacle Land Development, LLC
Mountain Waterworks, Inc, ID
U.S. Agency for International Development
World Bank
Asian Development Bank
Danida and the Netherlands Government
San Miguel de Allende Municipal Government, MX
Environment Agency Abu Dhabi
Abu Dhabi Global Data Initiative (AGEDI)
Urban Planning Commission Abu Dhabi
Geographic Planning Collaborative, International

"The success of this plan shows ability to coordinate among watersheds and communities to improve water quality, habitat and prepare for flooding needs, among other things. Residents in this region can be assured that their public funds are going toward projects that have widespread support and are protective of the water quality, water supply and environment."

- Ron Nelson, General Manager Nevada Irrigation District. Integrated Regional Watershed Management Plan (CABY), CA.

"We are so pleased to be working with a firm that takes a holistic view of the entire watershed. We believe this offers an incredible future for Silver Creek."

- Art Talsma, Director of Conservation, The Nature Conservancy's Silver Creek Preserve.

"The draft Enhancement Strategy is phenomenal. The document presented was impressive and reflected an amazing amount of information. The plan has now raised the bar for us resource managers who are working on developing management direction for resources.... I appreciate the hard work put into it.... Good job!"

-Yvette Tuell, Natural Resources Director, Shoshone-Bannock Tribes

"The Arab Region: Atlas of Our Changing Environment is a unique and powerful publication which brings to light stories of environmental change ... across the Arab region. Using a combination of ground photographs, current and historical satellite images, and narrative based on extensive scientific evidence, the atlas illustrates how humans have altered their surroundings and continue to make observable and measurable changes."

*- Achim Steiner
UN Under-Secretary General*

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