

Sustainable Resources for the Future

Initiative Component	FY 2001 Program Change \$(000)	Page Reference
Columbia River – Aquatic Resources	4,000	54
Great Lakes	500	57
Greater Yellowstone Area	400	59
Mojave Desert	400	61
Decision Support for Resource Management	10,000	63
Total	15,300	

“This research is part of a larger effort to develop and evaluate... alternatives for juvenile salmon and steelhead in the Snake and Columbia Rivers. Results have been/will be used to make decisions on which salmon recovery strategies are most likely to be effective.... USGS scientists have good record of being ‘credible’ and unbiased in their reporting and analysis of results.”

“Product is used to keep current regarding status of Great Lakes fish community and its relation to sea lamprey management. Product also serves as an excellent reference for future use. Product has direct influence on sea lamprey management options and their potential impact on fish community.”

“The information on prey fish communities is essential to management decisions on predator stocking levels and the general well being of the lake ecosystem. In addition prey species information is used in modeling exercises.”

“We used the mallard model to guide planning. The model allowed us to predict outcomes of planned management actions. It is an extremely valuable decision making tool.”

“The refuge has always needed a computer program to help make decisions on our complex water management program. It is much easier to look at a complex data sets and have the program provide alternative management strategies.”

Columbia River – Aquatic Resources

+\$4.0 million

Issue

The Columbia River basin, as well as the entire Pacific Northwest, has experienced tremendous landscape-scale change over the last 50 years. The Columbia River is a highly engineered system with 8 major hydropower dams, and numerous small dams, diversions, and alterations to its natural state. Also, the landscape has undergone significant urbanization, heavy logging, and agriculture development that have contributed to impacts on the natural resources of the system.

Pacific salmon are one of the natural resources most significantly impacted in the region.

Several salmon and trout populations are, or soon will be, listed as threatened or endangered, and other species such as white sturgeon and Pacific lamprey are potentially at risk.

USGS Role

In March 1999, the President proposed a new partnership to restore the Pacific salmon. The Pacific Coastal Salmon Recovery Initiative is designed to recover salmon by accelerating the use of Federal science and technology. USGS brings a broad array of science and technology skills to address the problems in the Columbia River Basin and throughout the Pacific Northwest. This array of skills enables USGS to provide basic understanding of the relation between behavior of downstream migrating salmon and the hydraulic dynamics for river water flow, and a conceptual foundation of restoring natural processes within the river and determining how best to monitor system health. USGS has the capability to meet regional-scale needs for basic geologic/geomorphic maps that can help define how much of a functioning riverine ecosystem is needed to improve survival of critical species, while maintaining human oriented benefits of the system.

Current Program

Across all Divisions, USGS expends approximately \$3.5 million in base funds and nearly twice that amount in reimbursable funds on science that supports understanding of fish population declines. A significantly greater amount of effort is directed at understanding aquatic ecosystems of the Pacific Northwest.

FY 2001 Program Change

USGS will devote its broad capabilities in physical, chemical, biological, and geographic information gathering and analyses to the complex problems of restoring salmon in the Pacific Northwest. Community leaders, resource managers, and the public have critical decisions to make to restore fish populations. Before these decisions can be made, scientific information is needed to effectively consider available options. A report recently released by the Committee on Environment and Natural Resources on restoration of salmon concluded that the current lack of success in restoration is in part due to an inadequate scientific base in fundamental areas.

Geographic Research and Applications +\$0.5 million: Geographic research will focus on the social-economics of fish restoration decision-making by carrying out a structured process called the INtegrated science and Community-based values in Land-use DEcision-making (INCLUDE).

The process will identify issues and values critical to stakeholders and perform cost-benefit analyses of management alternatives. Research will analyze and improve, where needed, existing geographic data sets in critical fish habitat watersheds.

Coastal and Marine Geology +\$0.5 million: Geologic research will investigate the influence of geomorphic change and sedimentation on the quality of salmon and trout habitat in the Columbia basin. Channel morphology and sediment processes are important factors for modeling hydraulic flow, temperature, and sediment transport. Pilot studies will focus on representative segments of the Columbia River and selected tributary watersheds. The research will integrate geologic data with other information in a Geographic Information System (GIS) for the Columbia River basin. Because natural and human-induced changes to geologic systems fundamentally influence habitat quality and the aquatic productivity, the predictive models and decision support systems for the Columbia basin will take them into account.

Hydrologic Research and Development +\$1.0 million: Hydrologic research will examine river reaches in the Columbia River basin to compare and contrast habitats with varying ecological functions. It will consider hydrologic and hydraulic information (discharge, flow velocity, minimum flow, ramping rates), geomorphic features (depth, cross-section, sediment load and channel bedform) and biogeochemical and food web processes (nutrient and energy dynamics). The aim will be to maintain and enhance the overall biological productivity and ecological health of the Columbia River, particularly the recovery of salmon and trout.

Biological Research and Monitoring +\$2.0 million: Biological research will link closely to studies of temperature, flow, and stream morphology/substrate conducted by other USGS divisions to support aquatic resources management in a basin-wide, integrated framework. Research will encompass aquatic habitat alterations influenced by land uses such as road building, irrigation, logging and urbanization. It will study how these activities affect fish production, migration, and survival. Researchers will look at risk factors associated with delays at dams, transport, and other stressors such as disease and contaminants and at critical ecological interactions affecting fish assemblages, including predation, competition, and invasive species. Studies will focus on salmon and bull trout early life history, particularly how fish populations are affected by factors important for sustaining primary productivity. Genetic and ecological requirements for cutthroat and bull trout restoration will be another research focus. Researchers will study the behavioral and genetic interactions between hatchery and wild salmon and trout, and the hatchery conditions needed to improve restoration.

Partners and Customers

The Federal government will carry out a critical role in salmonid conservation by facilitating the integration of science and information emanating from Federal, Tribal, State, academic, and local agencies. The Federal government also will ensure that provisions are made for consistent, high-quality information to be broadly disseminated to all stakeholders. Within the DOI, the Fish and Wildlife Service, Bureau of Reclamation, Bureau of Land Management, National Park Service, and Bureau of Indian Affairs are involved in the management of fish and wildlife resources, public lands, and water resources within the Columbia River Basin. Other Federal partners in scientific study and resource management include the Bonneville Power Administration, Army Corps of Engineers, National Marine Fisheries Service, Environmental Protection Agency, U.S. Forest Service, and National Oceanic and Atmospheric Administration.

Products

USGS will undertake a multi-disciplined approach to provide information needed by resource managers charged with recovery of critical species. Four areas of study and information gathering will provide a range of products that encompass habitats required by endangered fish populations. These include:

Habitat characterization and quality -

- Geospatial representation of physical, chemical, and biological factors that determine productivity,
- Physical and biological models to examine temperature and flow interactions that influence migration and survival,
- Identification of habitat and landscape components that limit population sustainability,
- Analysis of linkages among habitats required by fish populations throughout their life cycle from headwaters to the estuary.

Science for restoration of habitat altered by human actions -

- A framework for examining what aspects of habitat are limiting and what can be done to improve trout, salmon, and sturgeon numbers,
- Tools to predict impacts of management alternatives,
- Technical assistance and interpretation of existing data.

Biological and geophysical factors limiting fish populations -

- Identification of risk factors associated with stressors (such as disease and contaminants) that are mediated by the cumulative effects of management actions,
- Identification of genetic requirements for re-establishing salmonid populations,
- Evaluation of the consequences of genetic change from hatchery supplementation on viability and productivity of salmon and trout, and means to reduce deleterious genetic effects.

Socio-economics of salmon restoration decision-making -

- Carry out the INtegrated science and Community based values in Land Use DEcision making (INCLUDE) that will identify issues and values critical to stakeholders and perform cost-benefit analyses of management alternatives,
- Analyze and improve, where needed, existing geographic data sets in fish habitat watersheds and assist in development and use of decision support systems.

Great Lakes

+\$0.5 million

Issue

Population growth and demographic shifts, along with associated development, resource use, and land-use changes, have profoundly affected the Great Lakes Region. Among issues that currently receive attention due to human activities are: increasing use of Great Lakes water, and diversion of lake water out of the region; land-use changes such as urban and suburban growth, loss of prime agricultural lands, and restrictions in land use; availability of building resources such as glacial gravel, aggregate, and crushed stone; persistent chemicals in the lakes and on land that accumulate in fish and animal tissue and affect human and wildlife health; urban area brownfields; drinking-water contamination by pathogens; beach closings due to fecal contamination; introduction and spread of exotic species in the lakes, rivers, and inland lakes; and loss of critical habitat for fish and wildlife.

Because humans are not the only agents of change, issues related to natural climatic and geologic processes also receive attention. Such processes control the levels of the lakes and their shipping and recreation seasons, and significantly affect maritime transportation, wetland alteration and loss, shoreline erosion, flooding, periods of drought, and sustenance of biologic communities.

Many government agencies, universities, non-governmental organizations, and citizen groups have conducted natural-science studies related to these issues in the lakes or on the land. However, no regional organization has coordinated an approach to linking science in the lakes to science in the watershed and the surrounding region. This is a necessary linkage so that decision makers have the appropriate technical information to make informed decisions.

USGS Role

USGS scientists are responding to cooperators' needs for increased support for decisionmaking in the Great Lakes Region. The USGS is the only natural-science agency that transcends many jurisdictional boundaries and has the expertise to provide multidisciplinary information on various scales and to integrate information on lake and watershed processes in support of such decision making.

Current Program

The USGS recently completed the Great Lakes Region strategic plan to increase and sharpen the focus of USGS activities in the region, guide scientific research, and foster the coordination and integration of proposed studies to leverage with ongoing activities. The USGS will develop a science plan for FY 2001 activities that takes into account existing program work, already underway by groups such as the Central Great Lakes Geologic Mapping Coalition; the programs of the eight USGS District offices in the region; the Western Michigan and Lake Erie NAWQA studies; the USGS Biological Resources Great Lakes Program; and the Chicago and Detroit urban mapping effort and the USGS National Mapping Program. All of these programs have produced advances in geologic, hydrologic, water quality, cartographic and biologic information in the Great Lakes Region.

FY 2001 Program Change

Earth Surface Dynamics +\$0.5 million: The USGS effort will initially focus on Lake Michigan to look at watershed and lake processes and how they affect the living resources, primarily fish. Integrated activities will include water-quality sampling for various contaminants, geologic studies, habitat data inventory including effects of land use change on habitat loss, shoreline mapping to determine changes in coastlines, and analysis of land use change. This effort will complement other USGS programmatic activities that focus on the Great Lakes watershed and surficial processes and glacial framework of the Great Lakes region. The incorporation of the above earth and biological information into a single integrated Great Lakes database that will occur as studies progress will help managers make better decisions with respect to the future of all of the Great Lakes.

Partners and Customers

Other Federal, State, and local agency programs also will be considered, as will Canadian and bi-national programs, so that USGS activities will complement the work of those outside the Bureau. Such organizations include, but are not limited to, the International Joint Commission, the Great Lakes Commission, the Great Lakes Fishery Commission, the U.S. Environmental Protection Agency's Great Lakes National Program Office, the National Oceanic and Atmospheric Administration's Great Lakes Environmental Research Laboratory, the U.S. Army Corps of Engineers, the Council of Great Lakes Governors, State, county, and municipal governments, the Midwest Natural Resources Group, and other non-governmental organizations. With a knowledge of these programs and organizations, all USGS scientists working in the region will be able to establish effective partnerships and develop research priorities that meet the needs of those responsible for making resource management decisions.

Products

In order for the USGS Great Lakes science plan to be successful, the data USGS collects and the information based on the data must be targeted and rapidly disseminated to meet customer needs. The customers of USGS information in the Great Lakes Region include lawmakers, regulatory authorities, management agencies, scientists, nonprofit organizations, and the general public. Each of these audiences will require targeted products in order for the information to be most beneficial.

Greater Yellowstone Area**+ \$0.4 million****Issue**

An increasing number of people are drawn to live and recreate in the Greater Yellowstone Area (GYA) ecosystem, which contains the Nation's oldest National Park, unique wildlife resources, and the influences of one of the largest dormant volcanic areas in North America. Coexistence with wildlife is a delicate balance as the area is developed and wildlife habitat is fragmented. Managing this balance requires vastly improved information on landscape attributes (geology, topography, vegetation, climate, roads and trails, and hydrology), parallel information on the utilization of the landscape by wildlife and humans, and on the dynamic interactions among wildlife species.

USGS Role

Due to the long history of natural resource research in the GYA, USGS scientists are responding to cooperators to provide increased support for decision making in this area. The USGS is the only natural-science agency that transcends many jurisdictional boundaries and has the expertise to provide sound, independent, interdisciplinary information at various scales and to integrate information on lake and watershed processes in support of such decision making. The recent establishment of the Northern Rocky Mountain Science Center will help focus science needs, integrate multidisciplinary studies, and enhance collaboration with the National Park Service, Fish and Wildlife Service, Bureau of Land Management, and other stakeholders working in the GYA.

Current Program

The Greater Yellowstone Area Initiative was developed in partnership with the Bureau of Land Management, the National Park Service, and the U.S. Fish and Wildlife Service to conduct integrated interdisciplinary scientific analysis of the physical, chemical and biological characteristics of the region. Its intent is to foster better understanding to encourage informed natural resource decision making among Federal, State, and local resource management agencies, and the private sector. Resource managers in the GYA have identified integrated land information as a major requirement for integrated decision making. For these reasons, the Initiative focuses its work on the landscape scale.

The research strategy in the GYA focuses on four critical focus areas: wildlife - habitat interactions, human - habitat interactions, human - wildlife interactions, and biophysical processes (climatic, geologic, hydrologic, etc.). A strategic plan has been developed that provides an overview of each focus area, documents the current status of research, identifies key knowledge gaps, and defines research activities to eliminate these knowledge gaps. A common thread throughout all focus areas is the development of consistent contiguous spatial and temporal data sets that cover the entire GYA at a meaningful scale.

In addition to these focus areas, the research, data assembly/management, and modeling/decision support system development called for in the strategic plan will also investigate and account for the synergistic relationships that exist between the focus areas. The effects of these relationships will be included in the various decision support tools developed for resource managers and policy makers. These tools will allow managers and policy makers to

examine and evaluate multiple aspects/factors pertinent to land and resource management and to develop land management scenarios to determine human impacts on wildlife and habitat.

FY 2001 Program Change

Biological Research and Monitoring +\$0.4 million: For FY 2001, the USGS is bringing existing scientific data into a common spatial framework (geographic information system) for collaborative decisionmaking that reflects the needs of land and resource managers in the Greater Yellowstone area. Specific activities conducted with additional funding in FY 2001 include the development of more user-friendly software to enhance utility of existing climate data for decision making, historical inventories of land use and land change, and habitat selection analyses for threatened and other species such as the grizzly bear. By developing and sharing data resources with Federal and State agencies, information will be consistent and useful across ownership and management unit boundaries, and in a form that can be applied to management decisions concerning wildlife and its habitat, local zoning, geothermal and mineral resources, and natural hazards.

Partners and Customers

Direct and primary users of this research will be the member agencies in the GYA including Yellowstone National Park, Grand Teton National Park; the Gallatin, Shoshone, Custer, Bridger Teton, Beaverhead, Deer Lodge, and Targhee National Forests; U.S. Fish and Wildlife Service; Bureau of Land Management; the State Fish and Game agencies for the States of Idaho, Montana, Utah and Wyoming; and USGS. Other Federal, State, and local government agencies will benefit indirectly as results of this research are applied throughout the Greater Yellowstone Area.

Products

The project will produce contiguous biophysical geo-spatial data sets and graphical user interfaces, decision support tools, Web-based analysis tools, peer-reviewed publications providing ecological insights, and probabilistic habitat use models. The USGS has released a CD-ROM of the Digital Atlas of the GYA that displays thematic coverages of the GYA at various spatial scales. The CD-ROM was developed by the Aurora Partnership, a consortium of government and non-government organizations. Products such as the CD-ROM are likely to have application, and be transferable, to other Federal and State wildlife management units outside the region.

Mojave Desert
California Desert Water Resources and Ecological Monitoring**+\$0.4 million****Issue**

Springs, wetlands, and riparian areas and other water-dependent habitats are highly significant in the California portion of the Mojave Desert. Although limited in extent, they are rich in biodiversity, support numerous endangered, threatened and sensitive/endemic species, such as the desert tortoise, and provide desirable recreational opportunities for visitors. Rapid population growth on the edge of the Mojave Desert has resulted in increased demands for limited water resources. This competition for water is adversely impacting both water-dependent habitats, essential to the survival of desert plant and animal species, and recreation areas.

The Mojave Desert in California has extensive Federal lands. Between them, the Department of the Interior (DOI) and Department of Defense (DOD) manage three national parks, the 12 million acre California Desert Conservation Area, and 5 of the Nation's premier military training bases. Management decisions must increasingly rely on the need for water and biological research, which USGS is conducting in partnership with DOI, DOD, and State agencies through the California Desert Managers Group (DMG).

Successful land management of these desert lands depends on the use of current scientific information on the physical and biological resources and their trends. It is especially important to know the condition of the resource and how that condition is changing in response to management actions and natural and human change. Without a way to assess changing conditions, land managers cannot measure conservation progress or the effectiveness of actions prescribed in land management plans.

USGS Role

Insufficient hydrologic and biological data are available to adequately understand the complexities of the Mojave Desert ground water aquifer systems and their associated biological resource values. USGS has the capability to organize and compile new hydrologic information into a spatial database and establish monitoring protocols for both hydrologic and ecological conditions. USGS expertise in assessing ecological conditions and in developing both hydrologic and ecological monitoring protocols is essential to this project. Completion of tasks in this project will require the expertise of hydrologists and biologists, aided by geologists and geographers. This work will be done in partnership with NPS, BLM, and FWS as a project coordinated by the DMG.

Current Program

USGS has compiled hydrologic data (ground water levels, spring sources, water chemistry, surface water gaging) and is working on regional modeling of hydrologic systems. The USGS place-based study, Recoverability and Vulnerability of Desert Ecosystems, is identifying additional threats to ecosystems and assisting restorations.

FY 2001 Program Change

Geographic Research and Applications +\$0.4 million: In FY 2001, USGS, in partnership with the DMG, will focus this new initiative on monitoring of both water and ecological resources. Existing water data, such as groundwater levels, spring sources, water chemistry, and surface water, will be compiled into a spatial database for analysis by DMG partners and other stakeholders. The USGS will also complete a draft protocol that can be used desert-wide to monitor water chemistry and quality, water levels, discharge, and water use. The USGS will assess existing ecological monitoring strategies, develop a conceptual model of ecological system functions, and begin to design a practical and scientifically sound monitoring effort. When completed, the hydrological and ecological monitoring protocols can be used to track trends in water use and availability, and demonstrate the dependence of biological systems on a stable water supply.

Partners and Customers

Land management agencies participating in the California DMG (DOI, DOD, State of California) are the primary customers. The information will also be made available to communities, the private sector and the public. These customers need ready access to integrated scientific information on status and trends of the desert's hydrologic and ecological systems. This project will be undertaken jointly with NPS, BLM, and FWS, under the auspices of the DMG. Costs of the projects will be shared among FWS, NPS, BLM and DOD.

Products

USGS will produce practical protocols for monitoring and assessing the condition of both hydrologic and ecological resources for use by DOI, DOD, and State of California land managers. USGS will also produce databases and, in conjunction with the DMG, decision support systems that will be readily accessible by land managers over the Internet. In addition to members of the DMG, the information will also be made available to communities, the private sector, and the public which need ready access to integrated scientific information on status and trends of the desert's hydrologic and ecological systems. Among the specific products to be created by USGS in conjunction with NPS, BLM, FWS, and DOD partners and funds, USGS will have primary responsibility for: compilation and organization of existing hydrologic data into a spatial database for use in Geographic Information Systems; first draft of a protocol that can be used desert-wide to monitor water chemistry/quality, water levels, discharge, water use and surface water gaging; initiation of compilation of components of water budget for ground water flow system; preliminary evaluation of the role of climate on water budgets; and development of a conceptual model of ecological system functions.

Decision Support for Resource Management**+\$10.0 million****Issue**

Every day, managers at the local, regional, State, and Federal government level face difficult decisions about the complex natural resources under their care. The decisions they make affect water, earth resources such as sand and minerals, and native species such as fish, migratory birds, endangered species, and numerous other plants and animals, and the habitats upon which those organisms depend. Those decisions also affect the lives and livelihood of people in surrounding communities. Despite a massive accumulation of information about the environment, many decision-makers now find themselves in a quandary of how best to tap and interpret the rich library of scientific data necessary to balance the demands placed on the resources they manage.

Most of the data the USGS produces are in computer-readable forms that can be used in geographic information and decision support computer systems. Decision support systems have the potential to integrate data, methods, models, and other tools, within a framework that explicitly addresses the process of making decisions. While these computer systems cannot make the decisions for the land or resource manager, the systems are able to help the manager view the land in different perspectives, study different scenarios, and conduct what-if analyses.

About 70 percent of the cost of building a decision support system is aggregating and organizing existing data that will be used in the system. By better documenting the data with standards developed by the Federal Geographic Data Committee and formatting the data into commonly available formats, USGS could make more of its data and information useable at lower cost by land and resource managers. There are, however, no standards for predictive models that would be used in a decision support system. Because of a lack of standards, predictive models that are built for one system cannot be easily used in another system. Existing predictive models or decision support systems cannot always easily be linked together or otherwise used in conjunction with each other. This raises the cost for the land or resource manager to build the systems they need to help them in their decision making rather than using existing systems.

These challenges need to be addressed to allow natural resource managers to make informed decisions about the Nation's resources.

USGS Role

USGS is uniquely qualified to support land and resource decision-makers. The USGS will bring to bear all of its scientific capabilities B biologic, hydrologic, geologic, and geographic. Integration of these scientific disciplines will help land and resource managers solve the complex issues they face. Natural resource decision-making requires access to large amounts of scientific data and information from various disciplines, delivered in a form that can be readily used by resource managers. Through this initiative, the USGS will continue to build upon this unique capability and provide critical support to agency and private partners, especially those participating in the Administration's Lands Legacy initiative.

Current Program

Over the last several years, the USGS has increased its efforts to integrate scientific data and information within the bureau to help decision-makers at local, regional, and State levels. An example of this is the Upper Mississippi Decision Support System. Other Federal agencies, State officials, and resource managers along this river corridor use this system to produce scientific charts, graphs, and maps that allow them to study different scenarios for addressing specific management issues. Other decision support systems have been developed to provide access to energy resource assessments, to evaluate and apply water-allocation and management strategies, and to provide a better understanding of the issues involved in areas undergoing urbanization.

FY 2001 Program Change

This increase is part of the Administration's Lands Legacy initiative, State Planning Partnerships program. The additional funding will support the Lands Legacy's objectives, and in particular, help States and communities preserve local lands and habitat. The decision support systems developed through this initiative will provide the scientific, technological, and information management support that modern-day natural resource managers require to effectively address complicated, multifaceted problems.

The USGS will work in the Lower Mississippi region to help farmers, local officials, and natural resource planners in implementing the best management practices in heavily farmed areas of the floodplain. USGS scientists will conduct a pilot study in the Grand Canyon Corridor (coordinated with other Federal agencies) integrating remote sensing and other geospatial data to help resource managers. USGS will collect, integrate, and interpret geospatial, hydrologic, geologic, and biologic data in the U.S./Mexico Border region to aid resource managers and decision-makers on both sides of the border. This study would continue and expand investigations of water supply and water quality problems in this region. The USGS will contribute to the Lewis and Clark Expedition Bicentennial Commemoration by producing decision support systems for resource managers involved in land acquisition decisions.

Mapping Data Collection and Integration +\$0.4 million: The proposed increase will help address the geospatial data requirements of USGS scientists as they develop and implement data integration and predictive modeling capabilities that address resource management decisions. The integration and modeling of land surface and urban growth information with other physical, cultural, and historic information will result in a focus of geospatial data collection on digital imagery, hydrography, elevation, and land cover characterization within the appropriate study areas.

Geographic Research and Applications +\$2.0 million: The proposed increase will allow the USGS to strengthen data integration and predictive modeling capabilities that address resource management decisions. Emphasis will be placed on integrating and modeling land surface and urban growth information with other physical, cultural and historic information for the subject areas. Work will also be undertaken with industry representatives to develop standards for decision support system models and data that are compatible with standards for geographic data endorsed by the Federal Geographic Data Committee.

Mineral Resources Program +\$1.2 million: The increase will permit the USGS to expand its current activities in developing decision support systems needed by land managers dealing with

issues related to natural resources (such as sand and gravel) and the historical impact of mining. Pilot studies will be conducted applying advanced visualization techniques to remotely sensed data that can quickly help inform land management decisions and allow for rapid prioritization of resource issues. USGS geologic data bases, an essential part of proposed resource modeling and decision support systems, also will be standardized and integrated with other USGS data and systems.

Water Information Delivery +\$2.7 million: The increase would permit the USGS to develop better and more user-friendly simulation tools that can be used by land and water resource managers to predict outcomes of resource management actions under their consideration, and to make decisions about issues such as permitting ground water withdrawals, acquisition of land for habitat preservation, relicensing of power projects, and restoration of engineered river systems. The USGS will develop tools that (1) combine geochemical, microbiological, and hydrological information to provide quantitative information about water flow characteristics and water quality conditions in a study area, (2) simulate two-dimensional flow and transport in streams and rivers of variable gradients and flow conditions, and (3) provide new three-dimensional versions of ground-water models that can be used to more accurately describe the subsurface and processes of contaminant transport. In addition, the USGS will develop new tools for determining uncertainty in simulations – an important factor for land managers to consider in seeking solutions to complex issues. More sophisticated quantitative models that are user-friendly for inputting data and displaying results will provide a managers with better options to use the Nation's water resources more wisely.

Biological Research and Monitoring +\$1.2 million: This increase will provide the means to develop decision support tools for public and private resource managers charged with addressing several high priority resource issues, such as Habitat Conservation Planning in the southwestern and western United States, an endeavor that will aid both U.S. and Mexican conservation efforts. Decision support tools will be created for riverine and wetlands management in the Lower Mississippi Valley and the Pacific Northwest to benefit farmers, local officials, and natural resource planners in implementing best management practices and land acquisition policies. Other tools that are developed will be directed toward better management and monitoring for broader resource issues, such as migratory birds and sensitive fish populations.

Biological Information Management and Delivery +\$2.5 million: The increase would allow the USGS to provide new biological, physical, cultural, and historic data, information products, and analytical tools to State and Federal land managers and others along the Lewis and Clark corridor. The effort will highlight the biodiversity status of the corridor and will include cartographic, geologic, and water resources data integrated in a robust decision support system to aid the protection and restoration of national assets. This system will provide a characterization of land parcels in a manner similar but more expansive than the recent Gap Analysis pilot study conducted on the segment of the Missouri River between Fort Peck Dam and Great Falls, Montana. The geographic information system-based decision support tool will also be useful in supporting policy decisions on long-term land acquisition strategies aimed at protecting viewsheds, key wildlife habitats, historic sites, and popular recreation sites along the corridor.

Partners and Customers

Sustainable Resources for the Future

Customers for this initiative are those concerned with land and resource management in local and State governments, Department of the Interior bureaus, and other Federal agencies. The USGS will also continue to work with the Department of the Interior's U.S./Mexico Border Field Coordinating Committee to coordinate work in that part of the country.

The USGS will continue to work with the Lewis and Clark Interagency Memorandum of Understanding group to coordinate the design and building of decision support systems.

Work will also be undertaken with the Aurora Partnership, a consortium of government, academia, and commercial vendors, to develop standards for decision support system models and data that are compatible with standards for geographic data endorsed by the Federal Geographic Data Committee. USGS scientists will work with scientists in academia and private industry to establish standards for predictive models, computer simulations, and scientific visualizations so that they can be used in many different decision support systems.

The partnerships used for the efforts described in this initiative generally do not involve the exchange of funds from the USGS to other organizations. Rather, members of these partnerships each typically contribute technical, scientific, financial, or other forms of support under a shared research and development agenda. By sharing the workload and costs, more solid, long-lasting, and productive relationships are forged.

Products

The USGS will design and build decision support computer systems for the Lower Mississippi Region, Alaska's North Slope, in the U.S./Mexico Border region, and along the Lewis and Clark trail. The USGS will develop a robust decision support system that will provide physical, cultural, and historic information along the Lewis and Clark corridor using a broad range of data and information provided by USGS, other Department of the Interior bureaus, and other agencies. The system will provide land managers a scientific characterization of the Lewis and Clark corridor using Gap Analysis data as well as geologic, cartographic, and water resources information. The natural resources and cultural information provided through a decision support system will serve as a basis for comparing current conditions and ecological processes to those that existed 200 years ago, which will help support policy decisions on long-term land management of and potential Federal land acquisition in the area. Geologic mapping and geochemical sampling data in the U.S./Mexico Border region will be integrated with hydrologic and biologic data to improve land management decisions on both sides of the border.